RED ROCK LAKES NARRATIVE REPORT JANUARY-DECEMBER 1964

Division of Wildlife Refuges

Narrative Report Routing Slip

Refuge RED ROCK LAKES Year _____

Chief's Office: Mr. Gillett _____ ~~Mr. Ackerknecht~~ DA

Mr. Fermanich _____ Miss. Baum _____

Wildlife: Mr. Bellou _____ Mr. Webster _____ Mr. Stiles _____

Resources: ~~Mr. Stellberg~~ _____ Mr. Lumb _____ Mr. Britt _____

Interpretation: Mr. DuMont _____ Mr. Monson _____ Mr. Goldman _____

Planning: Mr. Crandall

Job Corps: Mr. Regan _____ Mr. Huenecke _____

RED ROCK LAKES REFUGE

NARRATIVE REPORT

January 1 to December 31, 1964

U. S. Department of the Interior

FISH AND WILDLIFE SERVICE

BUREAU OF SPORT FISHERIES AND WILDLIFE

MONIDA, MONTANA

RED ROCK LAKES NATIONAL WILDLIFE REFUGE

Monida, Montana

N A R R A T I V E R E P O R T

January 1, 1964

to

December 31, 1964

P E R S O N N E L

Charles W. Gibbons . . . . . Refuge Manager (Acting)
George A. Devan . . . . . Wildlife Management Biologist
(Transferred 7/27/64)
Eldon L. McLaury . . . . . Wildlife Management Biologist
(E.O.D. December 14, 1964)
Lynn C. Howard . . . . . Assistant Refuge Manager
(Temporary Assignment 8/4/64 - 10/12/64)
Ray A. Hotchkiss . . . . . Heavy Duty Mechanic
Robert M. Langdon . . . . . Clerk Typist
(Resigned 10/2/64)

Temporary Personnel

John Monarch . . . . . Wildlife Aid
(Temp. Assignment from Bear River Research Sta.)
Sam Breneman . . . . . Foreman
John Rebar . . . . . Maintenanceman III
Joseph F. Milhelish . . . Maintenanceman III
John C. Passmore . . . . . Maintenanceman I
Joseph O. Holt . . . . . Maintenanceman I
Joel Gleason . . . . . Maintenanceman I
John R. Garrison . . . . . Laborer

U. S. Department of the Interior

Fish and Wildlife Service

Bureau of Sport Fisheries and Wildlife

CONTENTS

		Page
I.	General	
	A. Weather Conditions	1
	B. Habitat Conditions	1-2
	C. Food and Cover	2
II.	Wildlife	
	A. Migratory Birds	3-7
	B. Upland Game Birds	7-8
	C. Big Game Animals	8-
	D. Fur Animals	9
	E. Hawks, Eagles, Owls, Crows, Ravens, and Magpies	9
	F. Other Birds	9-11
	G. Fish	11
	H. Reptiles	11
	I. Disease	11
III.	Refuge Development and Maintenance	
	A. Physical Development	12-14
	B. Maintenance	14-15
	C. Plantings	16
	D. Collections and Receipts	16
	E. Control of Vegetation	16
	F. Planned Burning	16
	G. Fires	16
IV.	Resource Management	
	A. Grazing	17
	B. Haying	17
	C. Fur Harvest	17-18
	D. Timber Removal	18
	E. Commercial Fishing	18
	F. Other Uses	18
V.	Field Investigation or Applied Research	
	A. Red Rock Creek Grayling Study	19-21
	B. Swan Incubation	21-22
	C. Swan Mortality Study	23-30
VI.	Public Relations	
	A. Recreational Uses	31
	B. Refuge Visitors	31-32
	C. Refuge Participation	32-33
	D. Hunting	33
	E. Violations	33
VII.	Other Items	
	A. Items of Interest	34-35
	B. Photographs	37-50
	C. Acknowledgements	35
	Signature	36

RED ROCK LAKES
MIGRATORY WATERFOWL REFUGE

January - December

1964

I. GENERAL

A. Weather Conditions

Weather this past year was about normal except precipitation was higher than it has been for several years. Many residents say it was about par with what the weather use to be in the Centennial Valley 10 or even 20 years ago.

The high recorded in July was 84 and the low recorded in December was minus 40. Precipitation this past year totaled 23.03 inches compared with 19.13 inches in 1962, and 21.09 inches in 1961. The month of June was the wettest with 6.06 inches of rain. Very little rain fell from July through the middle of December when we experienced a warm spell melting most of the snow.

The following data was compiled from the headquarters weather station:

January through December - 1964

Month	Max. Temp.	Min. Temp.	Precipitation Normal	Precipitation This Month	Snowfall
Jan.	36	-23	1.97	2.23	1.26
Feb.	38	-16	1.29	1.32	1.00
Mar.	54	-13	1.50	1.46	10.60
Apr.	58	4	1.40	1.87	2.40
May	74	20	2.55	1.44	T
June	78	29	2.67	6.06	0
July	84	34	1.18	.87	0
Aug.	83	30	1.32	1.90	T
Sept.	71	11	1.50	.29	0
Oct.	73	11	1.31	1.36	4
Nov.	53	-12	1.22	.28	8
Dec.	58	-40	1.64	3.95	35
Extreme	84	-40	Total	23.03 inches	62.26 inches

B. Habitat Conditions

High moisture experienced this past year created excellent water conditions on the refuge as well as Beaverhead County. High rainfall in

Habitat Conditions, continued

June caused high runoff filling the Upper and Lower Red Rock Lakes to an above normal level. Water continued to flow over the overflow structure at the impoundment on Lower Lake until very late in the summer.

Low ground depressions filled with water early in the spring as did all of our impoundments. Surcharge waters from Red Rock Creek were used in the filling of many impoundments and ground depressions.

All streams flowed ample water all summer as did the springs on the refuge. Lima Reservoir was filled to capacity and maintained all summer. The impoundment was two thirds full by freeze up. The past few years the reservoir has been drained by late summer.

C. Food and Cover

Grass and forb production was optimum as was shrub growth, Aquatics did well and persisted in abundance untill freeze up.

Because of the excellent stands of grass, grazing priveleges for this year were increased in several of the units.

Conditions were above normal this season for forb production. In early summer most of the valley appeared "blue" from Lupine. Ranchers to the north of the refuge lost stock due to poisoning from tall Lakespur and Death Camas; however, no losses due to poison were reported on the refuge.

Aquatics, as well as grasses and forbs were later in development because of a late spring. The lakes remained frozen three weeks longer than normal, thus holding back the aquatic growth.

II. WILDLIFE

A. Migratory Birds

Swan

(Trumpeter Swan incubation program and Trumpeter Swan Cygnet Mortality Study are covered under Part V of this report.)

Swan Nesting Study

Initial aerial observations revealed 53 nesting pair of swan on the refuge. Forty-four nests were actually verified at a later date from the air, and an additional five nests were located on Lower Lake by Wildlife Aid John Monarch. Two nests were never located from the ground, these being nest #5 and #7 on Lower Lake. The map, at the conclusion of Part V of this report, shows nest locations by number. The five additional nests are lettered A,B,C,D, and E.

Nest location this year, as in the past few years, are in the same relative location. Nesting sites are not exactly the same from year to year, but nesting territories remain fairly constant. In 1963, there were 51 nesting pairs, 45 in 1962, and 37 in 1961. The increased nesting territories reported in 1963 were mostly located in the river area between the two lakes.

Most of the nesting study was conducted from the air since observations from the ground were difficult to obtain due to the extended period of overcast weather in May and June.

Tabulated below are results ofcygnet counts taken from the air:

Date	Upper Lake	Swan Lake	Marsh Area	Lower Lake	Total
July 10	8	17	9	8	42
" 21	10	19	17	8	54
Aug. 10	3	11	8	3	25
" 11	12	8	0	12	32
Sept. 3	7	4	2	0	13
" 14	7	12	5	0	24

The twenty-four cygnets observed September 14th were reared to flight stage.

Cygnet Hatching Success

Hatching success of the Trumpeter Swan on Red Rock Lakes Refuge, both in the wild and in the incubation, was very poor. Of the 20 eggs in the incubator, only one hatched and from the 49 nests in the wild, the highest cygnet count was 54. Last year cygnets raised to flight stage totaled 127.

Cygnet Hatching Success, continued

Eggs were taken from most of the nests on the refuge after hatching failed to occur, and studied to determine the cause of failure. Of the eggs studied , 50% were infertile. The embryos in the remaining eggs had developed, in most all cases, to the 27th to 33rd day of development before dying. The exact cause of why the embryos died is not known, but it is our thinking that the dietary intake of the adult birds both prior to and during the laying period, did not provide the proper protein nor vitamins necessary for embryo development.

The results of the study of the eggs in the incubator correlated closely with what occurred in the wild. (See sections B and C of part V of this report).

Occurring this year, unlike at least the past four years, the lakes were frozen at a time when the swan are generally setting up and defending territories. At this same time, when generally the lakes are open, the swan return to a normal diet of aquatics after subsisting mostly on cereal grains all winter. This year, even at the beginning of the laying period, aquatics could not be obtained by the swan, and thus, had to continue feeding on grain at MacDonald or Culver Ponds.

It is planned, to commence this winter, to feed not only grain but a protein mash to the swan in an effort to overcome the dietary deficiency.

National Trumpeter Swan Survey

On September 14, 15, 16, and 17 the established aerial census strip was flown. The strip is composed of the tri-state areas of N.W. Wyoming, S.W. Montana, and N.E. Idaho. Flying weather was perfect with very good visibility.

The Annual Aerial Trumpeter Swan Census was conducted in cooperation with National Park Service personnel. Persons involved with the census are listed below:

Ray Glahn, Pilot Biologist, B.S.F.W.
Lynn C. Howard, Assistant Manager, Red Rock Lakes Refuge
Robert E. Howe, Park Mgt. Biologist, Yellowstone National Park
R. Alan Nebane, Assistant Park Naturalist, Grand Teton National Park

Information concerning Trumpeter Swans in zoos, parks,and other refuges was obtained by correspondence with individuals involved.

The 1964 grand totals of all areas censused in the United States outside Alaska is as follows:

Adults	Cygnets	Total
699	65	764

National Trumpeter Swan Survey, continued

Production of cygnets in 1964 was less than desireable with only 65 accounted for on all areas, which is the lowest record since 1947 when 60 were produced. Red Rock Lakes Refuge had 24 surviving cygnets at the time of the aerial census, two of which were shipped to the Audubon Park Zoo in New Orleans, Louisiana.

Due to the low cygnet production other cygnet shipments to zoos and parks requesting Trumpeter Swans were cancelled for the year.

Tabulated below by state, are the results of the 1964 survey:

State	Adult	Cygnet	Total
Montana			
Red Rock Lakes N.W. Refuge	180	22*	202
Centennial Valley (other than refuge)	217	4	221
Beaverhead and Gallatin National Forests	5	5	10
Montana Totals	402	31	433
Idaho			
Targhee National Forest	4	0	4
Island Park Area	40	4	44
Other Areas	2	3	5
Idaho Totals	46	7	53
Wyoming			
Yellowstone National Park	61	8	69
Teton National Forest	2	1	3
Grand Teton Park	26	1	27
National Elk Refuge	4	0	4
Targhee National Forest	13	0	13
Wyoming Totals	106	10	116
Nevada Totals	20	0	20
Oregon Totals	30	6	36
South Dakota Totals	22	11	33
Washington Totals	6	0	6
Captive Swans	67	0	67
Grand Total of all areas censused in the U.S.	699	65	764

*Two cygnets shipped to New Orleans included under Captive Swans.

National Trumpeter Swan Survey, continued

The below listed statistics represent Trumpeter Swan populations since 1932:

	Red Rock Lakes N.W.R.			Total, All Areas		
Year	Adult	Cygnets	Total	Adult	Cygnets	Total
1932	19	7	26	57	12	69
1933	15	9	24	49	17	66
1934	16	26	42	48	49	97
1935	30	16	46	46	27	73*
1936	31	26	57	76	41	117
1937	34	51	85	81	77	158
1938	28	42	70	93	55	148
1939	50	59	109	123	76	199
1940	58	48	106	123	68	191
1941	52	44	96	143	69	212
1942	45	43	88	98	53	151*
1943	88	25	113	137	34	171*
1944	106	58	164	207	72	279
1945	113	50	163	180	55	235*
1946	124	46	170	289	72	361
1947	131	49	180	292	60	352
1948	121	73	194	312	106	418
1949	132	61	193	348	103	451
1950	106	40	146	303	73	376
1951	170	76	246	417	118	535
1952	184	55	239	478	93	571
1953	211	38	249	478	99	577
1954	352	28	380	560	82	642
1955	242	41	283	495	95	590
1956	293	39	332	507	81	588
1957	159	45	204	399	89	488
1958	270	40	310	565	138	703
1959	271	40	311	582	99	681
1960	163	34	197	574	92	667
1961	155	14	169	536	83	619
1962	179	53	232	519	116	635
1963	145	122	267	488	227	715
1964	180	22	302	699	65	764

*Marginal areas not censused completely.

Whistling Swan

Whistling Swan use of the refuge this fall was light. Peak population on the refuge was 1,350 birds for a one week period. During the first two weeks of November, Whistling Swan on migration flew over the refuge in such numbers as to be quite noticeable day or night.

Geese

Goose use on the refuge was down almost 80,000 use days from last year. Use this year totalled 58,310 use days. Although swan use stayed about the same as last year, both duck and goose use dropped considerable.

Ten goose eggs were salvaged from nests around MacDonald Pond before the fishing season opened to prevent their loss by disturbance. All ten goslings hatched and were placed on Shambow Pond. Two died when pinioned and four have disappeared from Shambow. We believe they were taken by predators. The four remaining geese are wintering fine at Shambow Pond despite the harsh weather and freezing water conditions.

Ducks

Duck use totaled 6,517,980 use days this year compared with 9,880,652 use days in 1963. We cannot explain why the decrease in use days since waterfowl counts taken this year were based on aerial observations as they have been the past 3 years. Aerial counts commence in May and continue through September on a monthly basis. During these months the bulk of our duck use occurs.

Production totalled 5,055 this year compared with 4,420 in 1963 and 3,310 in 1962.

The chart on the following page displays in graphic form the use days of Trumpeter Swan, Geese, and Ducks for the past five years.

B. Upland Game Birds

Sage Grouse

Refuge population is estimated at 50 birds. Only one brood in refuge unit 1-G was observed this year.

Sage grouse use appears mostly in units 1-G, 14-G, and 13-G.

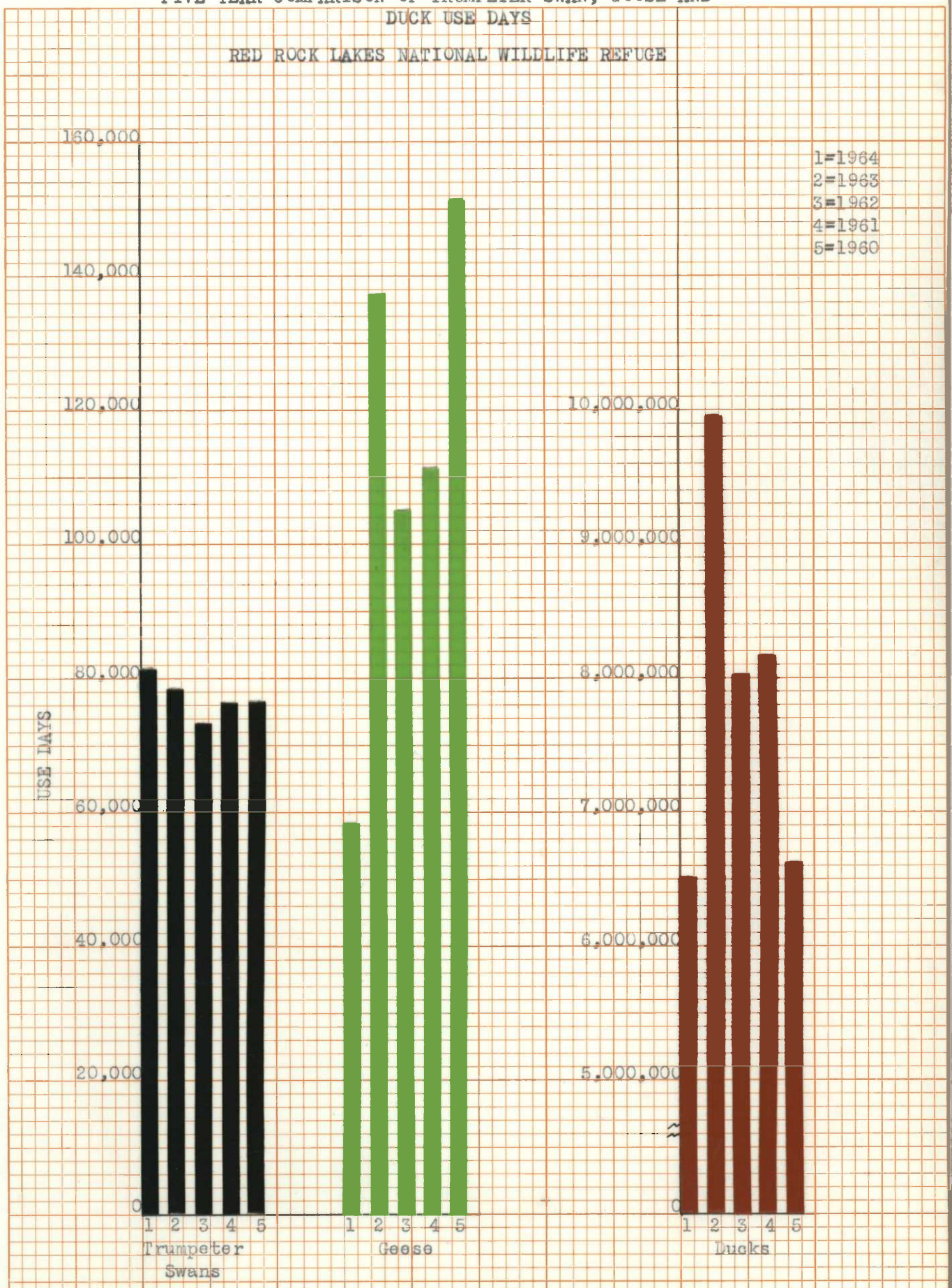
Questions have come up as to what happened to the high populations of sage grouse that use to inhabit the area. In conferring with state biologists, they have no answer, but are presently conducting studies near Lima, Montana to learn what they can.

Refuge reports dating back to 1935 have never carried very high populations, however, the first Refuge Manager, Archie Hull estimated about 200 birds using the refuge. Refuge Manager, Ward Sharp carried populations of about 50 birds during his tenure following Hulls'.

It is our opinion that high populations have never existed, at least in the past 30 years, and that habitat is limited on or near the refuge to carry much more than what we presently have.

FIVE YEAR COMPARISON OF TRUMPETER SWAN, GOOSE AND DUCK USE DAYS

RED ROCK LAKES NATIONAL WILDLIFE REFUGE



Upland Game Birds, continued

Mountain Grouse

Observation on these species is limited, but both Ruffed Grouse and Blue Grouse were observed during the summer months. We carry an estimated 60 Ruffed Grouse and 20 Blue Grouse.

Hungarian or Gray Partridge

About 35 of these birds have moved in since October. They are observed mostly in the vicinity of the swan feeding ponds.

Chinese Pheasant

Two pheasants, a male and female, moved onto the refuge headquarters site this winter. Their appearance in the Centennial Valley is rare.

The female disappeared about the middle of December and a Cooper's hawk was observed to take the male December 29th.

C. Big Game Animals

Elk

A few elk were observed in the spring and again in the fall while on migration. Twelve head is our estimated peak number for this species. Elk only inhabit the refuge during the summer months, and then on an on and off basis.

Antelope

Again this year about 650 antelope summered on the refuge. They are found in all refuge units arriving in April and leaving in November.

Moose

Aerial counts of moose were made whenever time permitted while making the monthly aerial waterfowl counts. Twenty-two head were counted July 22nd for the highest count.

Moose frequently cross the county road between refuge units 10-G and 9-G causing damage to refuge fences. The fences also present a barrier to moose calves during the summer. This problem has been recognized for many years and we intend to reconstruct the fences bordering the county road where moose requently cross to not only allow better crossing but to also prevent fence damage.

Deer

Mule deer were present in the usual numbers on the refuge with production similar to that of prior years.

D. Fur Animals, Predators, Rodents, and other Mammals

Fur Animals

Muskrat

Muskrat populations continue to increase on the refuge. This upward trend commenced about three years ago and has increased greatly since that time. Muskrat houses are most noticeable on Lower Lake where in one area alone the count was almost none three years ago, 90 houses are present now.

The increase is most welcome as the houses provide nesting sites for the Trumpeter Swan.

Beaver

Beaver populations are low at this time evidenced by the small amount of activity on the refuge.

Heavy trapping and a die off two years ago evidently is keeping these animals at a level that causes little damage to trees and prevents blocking of stream channels.

Predators

Red Fox

Waterfowl kills by this species was sufficient to warrant control measures. The high populations of fox exists not only on the refuge, but throughout the Centennial Valley. Our estimated population on or near the refuge was 250. The branch of Predator and Rodent Control has removed enough animals from the refuge to lessen the incidence of waterfowl kill.

Coyote

So few coyotes are found in this area that they are a rare but welcome sight.

E. Hawks, Eagles, Owls, Crows, Ravens, and Magpies

This group is well represented on the refuge and peak numbers, arrivals, and departures, correlates with past years.

F. Other Birds

White Pelican

A peak of 250 of these birds used the refuge in an on and off manner. They spent most of the time either on the structure at Lower Lake or near the fish trap on Red Rock Creek.

White Pelican, continued

No severe die-off occurred this year as did in 1962.

Western Grebe

A peak of about 500 of these birds used the refuge during mid-summer. This is a higher than normal population for this species.

Great Blue Heron

Present this year in about the same numbers as last year. One hundred and ten birds were the peak with 34 young produced.

Sandhill Crane

April 3rd was the arrival date for Sandhill Cranes and September 15th the approximate departure date. The estimated population was 300 birds for the refuge and adjacent lands.

The results of the crane census is tabulated below with three former years for comparison pruposes:

	1964			1963	1962	1961
Station	Adults	Young	Total			
1	6	0	6	10	2	4
2	27	3	30	26	21	11
3	18	0	18	5	2	7
4	9	2	11	8	12	11
5	10	0	10	0	0	2
6	11	0	11	6	2	4
7	25	0	25	8	17	8
8	14	0	14	4	5	6
9	8	1	9	2	4	11
10	11	0	11	12	3	18
Totals	139	6	145	81	68	82

The Sandhill Crane census, conducted mid-summer for the past four years, is a trend count in which to base a yearly population on. According to the figures presented above, 1964 is the peak year with 145 cranes actually seen.

(For detailed information on Sandhill Crane census techniques, refer to the May-August 1961 Narrative Report.)

Shorebirds

Arrival and departure dates, peak numbers, and young produced correlates closely with past years on this group of birds.

It should be pointed out that the new impoundments in refuge unit 13-G have attracted and held a good representation of shore birds during the summer months.

Other Birds, continued

Doves

This species was present on and adjacent to the refuge with about 100 birds. There is nothing unusual nor different to report on Doves this year.

G. Fish

(See part V for report on Grayling Studies)

No plants of fish were made this year on refuge waters or waters near the refuge.

Trout populations are fair, but plants will be required if high fishing pressure continues.

H. Reptiles

Nothing to report.

I. Disease

(See part V - Swan Mortality Study)

On November 23rd an adult male swan was found dead in MacDonald Pond. Examination of the bird at Bear River Research Station revealed the bird to have died from fowl cholera. This is the first reported incidence of fowl cholera at Red Rock Refuge.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development

Inverted Siphon

Installation of the inverted siphon at the MacDonald pond site was the principal development work accomplished this season. The siphon is necessary to convey irrigation water from Culver Pond to refuge grazing unit 15-G, where it is estimated 1,750 acres of land will be brought under irrigation. The siphon, itself, is a vital link in getting the water to its destination for the water must be conveyed across Elk Springs Creek. Around the year 1900, valley settlers constructed a wooden flume at the Elk Springs crossing where the siphon now rests. This flume functioned up untill the time the refuge was established. Due to construction costs and lasting qualities, an inverted siphon was installed instead of another wooden flume.

The siphon is 286 feet in length, and has a vertical drop of 13 feet. In order to facilitate our making the rock base the pipe rests on, a mineral permit was obtained from the U. S. Forest Service for a supply of basalt rock. By building a road into the rock supply and by then constructing a loading trap, we were able to move the 1,000 cubic yards of rock required to make the fill in a relatively short period of time. The fill was built wide enough to accomodate not only the pipe, but also a roadway. It is anticipated a supply of rock will be needed in the future as more earth dams are constructed that require rock rip-rap; and further, since this rock makes a good road base it will have an immediate as well as a future use for roadways.

The siphon pipe is three feet in diameter and was engineered to handle 15 cubic feet per second flow. In the center of the pipe and at its lowest elevation, a drain valve and manhole were installed so the pipe can be drained and flushed clean. The inlet and outlet of the siphon are reinforced concrete and constructed in a manner that causes the water to flow through the pipe - The outlet ditch level is six inches lower than the inlet ditch level.

The test runs this fall indicated the siphon to not only function as intended, but we feel it will handle up to 25 cubic feet per second flow due to some minor changes we adopted.

The installation of the siphon was accomplished through soil and moisture funds. Its value to the Soil and Moisture Development Program is paramount since it will facilitate the flow of water to a section of refuge where great potential lies in the impounding of irrigation run-off water that will create excellent waterfowl habitat as well as afford better forage conditions and cattle distribution.

Physical Development, continued

Irrigation Ditch

The primary supply canal leading from Culver Pond to the siphon was completed this summer. The canal leading from the siphon outlet to 15-G was one third complete by the time the work season terminated. The canal from Culver to the siphon is 7,200 feet in length and has ½ inch fall to every 100 feet of ditch. The canal is constructed with an eight foot bottom width, and with three to one side slopes. Since it follows a contour on a gentle slope, the down-slope side was pushed out and graded off to form a roadway. The same construction standards will be followed next season when the remaining four miles of canal are completed.

Canal work was halted this fall since we feel the ditch level can be raised from the point where we stopped to its eventual ending point, but first a survey will have to be run. This will be done next summer.

We anticipate irrigating on a limited basis next season by using a section of the original ditch that is in fair condition. Ditch checks, takeouts, and laterals will also be constructed and installed next season.

At the point of diversion from Culver Pond, a trash rack and fish grate arrangement was built in the canal. This structure will serve primarily to keep fish out of the canal, and also limit the amount of debris in the canal; however, the amount of debris in Culver Pond is almost non-existant compared with what is in Red Rock Creek where the water source for all irrigation practices initiates.

Picnic Creek Dam

The loan, by Camas Refuge, of a D-7 crawler tractor and 8-11 yard carry-all scraper enabled us to construct the dam this summer even with other development work to be accomplished and in view of the short outside working season. The dam was constructed near the point where Picnic Creek enters Elk Springs Creek. It totals about 900 feet in length and is about 15 feet high in the center where the old creek channel existed. We estimate about8,000 yards of material was required in its construction. The roadway on top has been graveled and two thirds of the dam has been rip-rapped on the water side. It is difficult to estimate the exact size of the water impounded, but it is the largest body of man-made water on the refuge. A rough estimate of between 200 and 300 surface acres would not be far off.

Eight islands have been created in this impoundment to date. These islands are of basalt rock to avoid the gradual wearing away caused by wave action on islands made of earth. Next spring, three more islands will be ma de.

Picnic Creek Dam, continued

Also planned for next season is the construction of another dam at the point where the backwaters of the Picnic Creek Dam terminate. This impoundment will create another pond with water backed to the face of Culver Pond Dam.

Shambow Pond enclosure fence.

Most of the wire had been stretched and secured into place the fall of 1963; however, several panels of wire remained to be put up this season. This work was accomplished in early summer. After the fence itself was complete, the ground on the inside of the enclosure and adjacent to the fence was "roto-tilled" so as to put it back like it was prior to fence construction. A wood stile was constructed over the fence to allow fishermen and tourists access to the pond. The fence gate was locked to prevent accidental opening and thus, the possible loss of the captive geese. A wooden swing gate and a short section of rustic jack fence was constructed on the east side of the enclosure. The gate allows access to the refuge hay field lying north of Shambow Pond.

Miscellaneous Development Work

A metal culvert was installed in the overflow of Culver Pond. This has been needed since the overflow has a northern exposure and retains a snow bank late in the spring that stops travel by wheeled vehicle.

Four large steel culverts were installed in the irrigation canal that leads both to and from the siphon. The culverts were installed rather than build wood bridges since they are easy to install and should out last a wood bridge. One bridge was built across the canal to allow access to the grain bins at MacDonald Pond.

A five to eight acre pond was created in conjunction with the irrigation canal in refuge unit 15-G. A dam was built at a place that would tend to impound water, rather than to dig a canal into the ground.

This dam is about 800 feet in length and used about 5,000 yards of material. The average depth of this pond is about 5 feet.

B. Maintenance

Several items were acquired from surplus property listings this season that have and will continue to aid in outside maintenance of physical developments. We acquired (1) a portable A.C. generator, (2) a portable compressor, and (3) a shovel attachment for the dragline. These items are the most useful that were acquired this summer; however, in order to continue with development work, we need a D-7 or D-8 crawler tractor with matching carryall scraper.

Maintenance, continued

Building Maintenance

Quarters # 90 (Zink) was stained as were the log garages for Quarters #90 and #1. Trailer #1 was painted.

In the service building , the managers office was altered by removing the sink and work bench; thus allowing room for expansion in the overcrowded office. An enclosure was built over the stairs leading to the basement, and the floors of two stalls were patched with a concrete patch and painted. The office floors were covered with vinyl tile.

Vehicle Maintenance

Routine maintenance was accomplished on the refuge fleet throughout the period. The refuge mechanic was busy during the summer months keeping the old trucks and equipment in running order.

Several trucks are scheduled for repainting this winter. The dragline was painted this past summer.

Fence Maintenance

All refuge boundry and interior fences were gone over this spring. This involved three fencing crews, and took one and a half months. We feel the fences were put in good shape considering their age. This past summer, a minimum amount of complaint was voiced concerning the refuge fences. We hope to continue this practice of fence repair as well as to try and replace 2 to 3 miles of old fence every year.

Miscellaneous Maintenance

The fish grate holding frame broke under the extreme high water conditions experienced this spring. This grate forms the trash rack located at the irrigation canal point of diversion from Red Rock Creek. The concrete structure was repaired in the fall.

Several headgates in the irrigation system completed two years ago were repaired and rip-rapped. One ditch was enlarged and a wing dike constructed to facilitate conveying water to Culver Pond where it will be taken from there and conveyed to the north side of the refuge.

Refuge roads were graded both in the spring and again in the fall. A new road was constructed from the County road, across Picnic Creek Dam, across the rock fill for the siphon pipe, and into the cow camp at MacDonald Pond. This road was graveled and graded.

Four cattle guards were set this summer in refuge roads and four more are scheduled to be set this coming spring and summer.

C. Plantings

The following trees were planted:

Caragana	25 ea.
Russian Olive	50 "
Chinese Elm	50 "
Northern Cottonwood	50 "
Hybrid Elm	2 "
Weeping Willow	2 "

The Caragana, Russian Olive, Chinese Elm, and Northern Cottenwood were planted around Shambow Pond and MacDonald Pond to serve as wildlife cover and food patches. They will also serve as wind breaks. A few of each of these species was planted at headquarters for ornamental purposes as were the 2 Hybrid Elms, and 2 Weeping Willows. All plants were in good condition when planted. Survival rate is unknown at this time.

D. Collections and Receipts

None to Report

E. Control of Vegetation

Nothing to report

F. Planned Burning

Nothing to report

G. Fires

This past season was above average for the number of range and forest fires in this county. We were quite fortunate in having but one range fire on the refuge in view of the fact that at least two other fires of good size were reported near the refuge and in the Centennial Valley.

Although the cause of the fire is unknown, the point of origin was either in the northeast corner of section 25 (in 14-G) in the refuge, or very close to this point.

Refuge acreage burned over was about 20, while about 600 acres of Forest Service land was burned. The only damage to refuge improvements was approximately 150 yards of fence burned in the northeast corner of section 25. Of the refuge acreage burned, about 10 acres is in section 25 and about 10 acres in section 31, the section which we share jurisdiction with the Forest Service.

IV. RESOURCE MANAGEMENT

A. Grazing

A total of 5,343 head of cattle, not including calves, grazed 17,741,23 AUMS from the refuge this season. The revenue received from grazing totalled $31,047.15.

At the annual meeting of the Red Rock Lakes Cattlemen's Association, 18 permits were issued to association members for grazing privileges. Twenty-one permits were issued total for the refuge grazing.

Effective this season, the grazing fee increased from $1.25 to $1.75 per animal use month. This increased fee was based on a three year survey of prevailing grazing fees charged in Beaverhead County. Although some opposition to the increase was voiced, all permittees desired permits, and continued operations on the refuge as in the past.

Optimum range conditions this year warranted grazing increases on the refuge. Several permittees availed themselves of the increase.

The winter grazing program commenced November 15th this year. Four permittees utilized refuge lands for this privilege.

B. Haying

Total tons of wild hay harvested from the refuge increased 174 tons over last years harvest. This year, 758.45 tons of wild hay were harvested, resulting in a net revenue of $3792.35.

This year the rate of charge for wild hay increased from $3.00 per ton to $5.00 per ton.

Since our irrigation system from Red Rock Creek on unit 13-G has increased the grass productions; consideration has been given to reactivating a former hay field in that unit. At the present time we have a demand for wild hay as we do for summer grazing; however, the hay fields attract sand hill cranes and antelope after harvest more so than do the pastures, and for that reason we feel justified in setting up a new hay field.

C. Fur Harvest

Two trapping permits were issued with the following listed furbearers taken on the refuge:

Mink	-	11
Beaver	-	9
Muskrat	-	3 (accidentally caught)

We desire the beaver trapped since they are a nuisance, and the mink trapped since they are a predator on the more valued muskrat.

Both trappers would have trapped the refuge for a longer period of time,

Fur Harvest, continued

but personnel circumstances prevented it, as it was each trapped less than a week.

D. Timber Removal

Nothing to report.

E. Commercial Fishing

Nothing to report.

F. Other Uses

A right of way was granted to the Vigilante Electric Cooperative of Dillon, Montana to cross the refuge with a power transmission line. Since the line was to cross the structure on Lower Red Rock Lake, we felt the line should go underground to avoid the incidence of low flying waterfowl hitting an overhead wire. The firm cooperated by laying underground cable from a point 301 feet south of the south river bank, across the structure, and then to a point 300 feet north of the north river bank. All total, the cable is about 1,200 feet in length.

No observation of waterfowl hitting the overhead portion of the power line have been reported.

V. FIELD INVESTIGATION OR APPLIED RESEARCH

A. Red Rock Creek Grayling Studies, April through June 1964

The Red Rock Creek fish counting weir was placed in operation April 30, 19 days later than last year. The later operational date this year was due to the iced-in conditions at the trap.

Water levels at the trap were maintained at optimum operating levels until the first week of June when extreme high water caused by rain and snow run-off forced trap operations to cease.

Upstream fish migration commenced May 8 with 5 grayling, 3 cutthroat trout and 1 brook trout. The cutthroat trout migration through the weir totalled 30 fish - 15 males and 15 females. The males displayed a very vivid red color, while the females appeared normal in coloration. Five cutthroat had right ventral fin clips indicating they had been trapped and marked in the upstream trap last year. One spawned-out female cutthroat was found dead in the downstream trap May 24. This was the only downstream trap activity with cutthroat this season.

The grayling upstream migration totalled 585 fish for this season, compared to 1,000 fish a year ago. A few grayling were in migration upstream when the trap was "pulled", but the major portion of the run appeared over by that time. One hundred ninety-eight of these grayling had a right ventral fin clip, 14 had both left and right ventral fin clips, and three had left ventral fin clips only. Fin clips indicated the grayling to have passed through the upstream or downstream or both traps, last year. During the first year of the trap operation - 1962 - 40 grayling were tagged on an experimental basis. Nine of these showed up last year and one passed through the traps this year. The return on marked and tagged grayling this year was 37%. The sex ratio was 281 males to 304 females with the males dominating the first part of the run and the females dominating the latter part of the run. Most of the grayling on the upstream migration appeared in a healthy, vigorous condition with a few showing evidence of blue heron attack. The average length of the grayling was about the same as the past two years - about $15\frac{1}{2}$ inches.

The recorded downstream grayling migration was limited to 15 spawned-out females found dead in the trap June 6. Because of the extreme high water conditions and the downstream grayling migration occurring at the same time, the grates of the trap were removed to prevent further grayling mortality.

The main sucker run began June 4 and continued until the trap operation ceased. A total of 752 suckers were removed from the trap this season. Downstream sucker movement was limited to 5 fish found dead on the grates June 6.

Red Rock Creek Grayling Studies, continued

It appeared that our irrigation diversion located about 2 miles upstream from the trap is not large enough to handle extreme high water conditions such as we experienced this year. A larger fish trap, built to handle these high water conditions would be desireable if this grayling study is to be continued.

No marking or tagging of fish was done this year, although we believe tagging would be of value in obtaining statistics concerning grayling migration, spawning, longevity, and growth ratios.

Exibit A shows daily fish movement through the Red Rock Creek weir for this year.

Exhibit A

Daily Fish Record
Red Rock Creek Weir

Upstream Trap

Date	Grayling	Cutthroat	Brook	Sucker	Max. Water Temp.
May					
8	5	3	1		42
10	4			2	42
12	7	6		3	54
13	50			1	51
14	3				49
15	20	4		1	54
16	12			7	54
17	43	7		16	53
18	30	4		3	53
19	46	3		16	52
20	66	1		8	54
21	48	1		20	51
22	32			3	50
23	27			4	49
24	3				48
25	25			6	54
26	42			11	42
27	27			20	49
28	14			44	39
29	3			3	47
30	35	1		5	52
31	3			3	50
June					
1	1			4	48
2	21			8	57
3	3			4	52
4	7			207	46
5	2			151	48
6	5			202	45
Totals	585	30	1	752	

Red Rock Creek Grayling Studies, continued

Downstream Trap

Date	Grayling	Cutthroat	Sucker
May 24		1*	
June 6	15*		5*
Totals	15	1	5

*Mortality

B. Trumpeter Swan Incubation Program, 1964 season

The following is a brief summary of the data compiled from 19 eggs which were broken and examined upon failure to hatch.

The eggs were originally collected from four nests situated downstream from the refuge. The eggs were brought to the refuge headquarters and kept in an incubator under constant surveillance.

Originally there were 20 eggs, but one hatched on June 24th. This bird subsequently died on June 28th and a post mortem was performed.

The data will be presented by nest and egg number in the order of A, B, C, and D.

The embroys in those eggs which were found to be fertile were given an approximate age using the technique developed by Labusky and Opsahl in 1958. Due to the difference in incubation periods between swans and pheasants (35 days approximately as to 23) an extra one-half day was allowed for each period of development.

Nest A - Total 4 eggs

Two eggs were found to be infertile.
The other eggs both contained well-developed embryos which appeared to be between 27 and 29 days of age at the time they died.

Nest B - Total 6 eggs

Four eggs were found to be infertile.
Of the other two eggs, one embryo gave the appearance of being approximately 28-29 days at the time of death; the other appeared to be approximately 32-33 days of age when death occurred.

Nest C - Total 5 eggs

One egg found to be infertile.

Trumpeter Swan Incubation Program, continued

Nest C, continued

Of the remaining four eggs, one embryo appeared to be approximately 27-28 days of age when death occurred.

Nest D - Total 5 eggs

Two eggs found to be infertile.
Of the other three eggs, one hatched on June 24th but died on June 28th. The other two eggs produced embryos which appeared to be approximately 30-31 days when death occurred.

From the data compiled the following can be noted:

1. Had there been 100% hatching success there would have been a 11/9 or 55.0% hatching success ratio.

2. Most of the embryos had appeared to reach what could be classed as minimal full term for incubation.

Conclusions:

At this time it is felt that no definite conclusions can be drawn due to the lack of supporting data. Rather, the following questions have been brought out:

1. With the majority of the embryos reaching what appears to be full term and then dying in the shell, is there a possibility that the density of the egg shell is such that the birds cannot penetrate it? If so, is this the result in the change in feeding habits of the birds?

2. Why had some of the embryos died at earlier stages in development?

3. Has this problem actually occurred before with a lack of factual evidence resulting in its going undetected?

4. Could there be a physiological abnormality in the embryos which resulted in their deaths?

5. Why had some of the embryos died at earlier periods of development than others?

It seems as though the problem boils down to whether it is a single factor or multiplication of factors which has resulted in complete failure. As mentioned before, shell density can be considered (a random sample of shell will be sent to Denver for chemical analysis) as a possibility, embryo physiology can also be considered and undoubtedly many other factors would come to light if a full scale study were undertaken.

C. Swan Mortality Study - 1964 Season

The following report was prepared by John Monarch, Wildlife Aid, of the Bear River Research Station. It has been included in this narrative in its entirety except for the individual autopsy reports which can be found in the original report dated September 23, 1964.

A. Field Studies

Field studies started on May 27, 1964, although the nesting pairs on Lower Lake which were to be studied were not selected until the following week because of inclement weather. Observation of the study pairs which were ultimately selected on Lower Lake were made from posts at the Structure, Butana, Idlewilde, and the hill behind sub-headquarters. Three nests were selected for infrequent observation on Upper Lake. Observation of these nests were conducted from a post on Sheep Mountain, and during canoe trips on the lake.

The first broods observed on Lower Lake were on July 7, although the birds had probably hatched prior to and during the previous weekend. That some broods may have come off earlier in the marsh area and on Swan Lake was borne out by the fact that there was a variation in the age of the cygnets observed, and hence indicated a variance in the time that the different broods came off. Since only three of the nests on Lower Lake produced broods, the program of constant surveillance was reduced to a short daily check. Emphasis then being placed upon covering as much area as possible in hopes of finding a greater number of cygnet mortalities.

The data on hatching success are summarized in the following table:

Nest	No. of Eggs	Eggs Hatched	Percent Hatching Success
A*	5	2	40%
B*	4	0	0%
C*	4	0	0%
D*	5	3	60%
E*	2	0	0%
1	4	0	0%
2	4	2	50%
3	4	0	0%
4	5	0	0%
5**	Unknown	0	0%
7**	Unknown	0	0%
42	4	0	0%
43	5	2	40%
44	4	0	0%
Totals	50	9	
Total hatching success 9/50			18%

* Nests A, B, C, D, and E were not noted during the aerial census.
** These two nests were never located, it being the writers belief that they never existed, although pair #5 was observed occupying a territory throughout the summer.

The following table summarizes the total cygnet mortality:

Nest No.	Cygnet No.	Weekly Cygnet Losses 1	2	3	4	5	6	7	8	9	10	11	Percent Loss
A	2	0	0	0	0	0*	0	0	0	0	0	0	-
B	0	-	-	-	-	-	-	-	-	-	-	-	-
C	0	-	-	-	-	-	-	-	-	-	-	-	-
D	3	1	0	0	0	2	-	-	-	-	-	-	100%
E	0	-	-	-	-	-	-	-	-	-	-	-	-
1	0	-	-	-	-	-	-	-	-	-	-	-	-
2	2	0	0	0	0	2	-	-	-	-	-	-	100%
3	0	-	-	-	-	-	-	-	-	-	-	-	-
4	0	-	-	-	-	-	-	-	-	-	-	-	-
5	0	-	-	-	-	-	-	-	-	-	-	-	-
7	0	-	-	-	-	-	-	-	-	-	-	-	-
42	0	-	-	-	-	-	-	-	-	-	-	-	-
43	2	1	0	0	0	0	0	0	0	0	0	0	50%
44	0	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	2	0	0	0	4	0	0	0	0	0	0	-

Total cygnet loss - 6
Percent cygnet loss - 6/9 66%

* The two cygnets from this brood were missed during the fifth week, but apparantly joined the brood from Nest #10. (See Chart on Page 1.)

As opposed to 1962 and 1963 when all cygnet mortality occurred within four weeks after hatching, a number of cygnets were found that had died during the seventh or eighth week. Their deaths could probably be attributed to the period of inclement weather which occurred during the latter part of August. During that time sub-freezing temperatures were common and snow fell on two different occasions. The cygnets were found the week following the last and most severe snowstorm.

B. Mortality by Breeding Territory

Of first importance when observations were initiated was the locating of nests, and loafing areas and the determining of the territorial boundaries. Knowledge of these three, it was felt, would be of utmost value when a search had to be made for a missing cygnet or cygnets. Territories were rather well defined early in the summer, but as nests were abandoned and/or cygnets lost a degree of territorial overlap began to occur. Later in the summer several pairs could be observed occupying a particular feeding area at the same time. Some pairs, however, were noted to defend their territory against trespassers throughout the entire study period.

As in previous years most of the dead cygnets were found on the nest, nearby, or a loafing area or entangled in aquatic vegetation.

Mortality by Breeding Territory, continued

The following is a list of breeding territories and the corresponding cygnet mortalities for those areas:

Nest #A: This brood was composed of two cygnets until the fifth week, when both apparently joined the brood of Nest #10.

Nest #B: This nest had four eggs, but was abandoned in the middle part of July.

Nest #C: This nest contained four eggs, none of which hatched. The pen incubated the eggs approximately 20 days longer than any other.

Nest #D: Of the three cygnets in this brood, one was lost during the first week after hatching. It was found during the tenth week (S-16-64). The other two cygnets (S-7-64 and S-8-64) died during the fifth week. They were found on a loafing area about 100 yards east of the nest.

Nest # E: This nest contained two eggs, but was abandoned in the middle part of July.

Nest #1: This nest contained four eggs, but it too was abandoned in the middle part of July.

Nest #2: Both the cygnets in this brood were lost during the fifth week. The carcasses were never recovered.

Nest #3: This nest contained four eggs, but was abandoned in early July.

Nest #4: This nest contained five eggs. It, too, was abandoned in July.

Nest #5: This nest was never located.

Nest #7: This nest, like nest #5, was never located.

Nest #42: This nest contained four eggs, but was abandoned in early July.

Nest #43: Of the two cygnets in this brood, one died shortly after hatching and was found at the base of the nest (S-5-64). The remaining cygnet was still alive at the end of the study.

Nest #44: This nest contained four eggs. It was abandoned in early July.

Seven additional cygnet mortalities were collected during the study. Due to the location where found each was assumed to belong to the pair occupying that territory. They are as follows:

Nest #10: When first sighted during the second week, three cygnets were observed. During the fourth week one of the cygnets (S-6-64), which had probably died during the third week, was found floating in water near the

Mortality by Breeding Territory, continued

nest. During the fifth week four cygnets were observed in this area. The two additional cygnets were believed to be those missing from Nest #A.

Nest #12: Three cygnets were observed in this area during the second week. None were noted to be missing until the eight week when one (S-10-64) which had died during the seventh week was found caught in a patch of sedge about 100 yards east of the nest.

Nest #13: Six cygnets were originally observed with the pair occupying the territory. All were subsequently lost. Two were later found. One cygnet (S-11-64) was found during the eighth week floating in the water about 50 yards east of the nest. Another cygnet (S-14-64) was found during the ninth week on a loafing area about 100 yards west of the nest.

Nest #21: The total of 5 cygnets were observed in this area during the fifth week. During the seventh week two died and were subsequently found during the eight week. One cygnet (S-12-64) was found floating in the water about 100 yards west of the nest. The other (S-13-64) was found on a loafing area near the nest.

Nest #30: A dead cygnet (S-17-64) was found during the eleventh week on a loafing area west of the nest.

The following is a list of all swan carcasses recovered during the study period. They have been put in sequence to correspond with the order in which they were found and autopsied.

The great number of other species mortalities collected make it almost prohibitive to give the location where each was found. Rather, each has been given a number corresponding with the respective necropsy report. This number has then been placed upon the enclosed territorial and nesting map in the approximate location where the bird was found.

Number	Date of Collection	Where Found (territory)
S-1-64	1 June 64	Found at Breneman ranch
S-2-64	13 Oct. 63	Found in water near Structure
S-3-64	16 June 64	Found on southeast shore of Upper Lake
S-4-64	28 June 64	Robbed from Nest #D* - died in Headquarters rearing pen
S-5-64	13 July 64	Nest #43 - found at the base of the nest
S-6-64	29 July 64	Nest #10 - found floating in water near nest
S-7-64	6 Aug. 64	Nest #D - found on loafing area 100 yds. east of nest
S-8-64	6 Aug. 64	Nest #D - found with S-7-64.
S-9-64	25 Aug. 64	Found near Butana. Died at refuge next day

Mortality by Breeding Territory, continued

Number	Date of Collection	Where Found (territory)
S-10-64	25 Aug. 64	Nest #12 - found caught in sedge 100 yards from nest
S-11-64	25 Aug. 64	Nest #13 - floating in water 50 yds. from nest
S-12-64	25 Aug. 64	Nest #21 - found floating in water 100 yds. from nest
S-13-64	25 Aug. 64	Nest #21 - found on loafing area near nest
S-14-64	3 Sept.64	Nest #13 - found on loafing area 100 yds. from nest
S-15-64	5 Sept.64	Found on north shore of Upper Lake
S-16-64	9 Sept.64	Nest #D - north shore of Lower Lake - near nest
S-17-64	15 Sept.64	Nest #30 - found on loafing area near nest

*This being from Nest #D located downstream from the Structure and not to be confused with Nest #D located in the study area on Lower Lake.

C. Laboratory Studies and Findings

All birds collected which were suitable for post mortem examination were studied at the field laboratory. All other mortalities which were collected, but not suitable for examination here were saved for study at Bear River. Samples of organs and tissues from all birds autopsied were preserved in 10% formalin. Samples of heart, lung, liver, spleen, and kidney tissue were cultured in all cases. In those cases where other tissues were noted to be abnormal, they too were cultured for bacterial growth. All subsequent bacterial growth was subcultured and classified according to Gram's method. In every case the intestinal tract was left intact in its entirety so that an intensive study of the contents could be made at Bear River.
(See final report to Refuge Manager dated September 23, 1964 for individual Autopsy reports).

As noted previously a number of other mortalities were collected, but due to their condition were not examined here. Rather, they were saved for study at Bear River.

Examination revealed that a great number of young birds, most of which were found on Lower Lake, had died of mechanical injuries. In all cases the ribs were found to be broken and piercing the lungs, which resulted in a great deal of clotted blood being found in the pleural cavities. In nearly all cases the liver had also been ruptured releasing blood into the abdominal cavity. This, too, would seem to indicate that the birds had been crushed by a relatively large animal. In many cases the brain had also been damaged.

In nearly all cases tissues which were cultured produced bacteria. Most of

Laboratory Studies and Findings, continued

these were found to be of the gram (-) variety although a number of the gram (-) form were isolated.

D. Embryological Studies

Due to the fact that only one of the eggs being incubated at the refuge hatched, a program was undertaken to study the remaining eggs plus any that were collected from the nests. Four eggs from the nest of the pair at Swan Lake, which were shot in early June, were also studied.

The findings on the eggs which were artifically incubated plus those from Swan Lake can be found in the report titled "Artifical Trumpeter Swan Incubation Program Summary, 1964 Season" dated July 10, 1964.

A summary of the findings for 68 eggs collected from nests on the refuge follows:

Nest #A* - Total 5 eggs

Two of the eggs hatched. Two were found to be infertile. The remaining egg was fertile and contained an embryo which appeared to have died at approximately the 28th or 29th day of development.

Nest #B*- Total 4 eggs

All eggs were found to be infertile.

Nest #C* - Total 4 eggs

Two eggs found to be infertile. The remaining two eggs contained embryos which appeared to have died at approximately the 31st to 33rd day of development.

Nest # D* - Total 5 eggs

Three eggs hatched. The remaining two eggs were infertile.

Nest # E* - Total 2 eggs

Both eggs were infertile.

Nest #1 - Total 4 eggs

All eggs found to be infertile.

* These nests should not be confused with those from which the eggs were robbed for the artificial incubation program. These being nests that were not spotted during the aerial census, but later found and given an appropriate letter designation.

Embryological Studies, continued

Nest # 2 - Total 4 eggs

Two eggs hatched. One of the remaining eggs was infertile, the other contained an embryo that appeared to have died at approximately the 31st day of development.

Nest #3 - Total 4 eggs

Two eggs found to be infertile. Of the remaining two eggs one contained an embryo that had died at approximately the 28th to 29th day of development. The other had died at approximately the 31st to 33rd day.

Nest #4 - Total 5 eggs

Two eggs found to be infertile. The remaining three eggs were all found to contain embryos that had died at approximately the 31st day to the 33rd day of development.

Nest #10 - Total 4 eggs

Two eggs hatched. One of the remaining eggs was infertile, the other contained an embryo which had died at approximately the 32nd to 33rd day of development.

Nest #11 - Total 4 eggs (assumed)

Three eggs hatched. The remaining egg was infertile.

Nest #14 - Total 5 eggs

Four eggs found to be infertile. The remaining egg contained an embryo which had died at approximately the 31st to 33rd day of development.

Nest #34 - Total 5 eggs

Two eggs found to be infertile. Of the remaining three eggs one contained an embryo and had died at approximately the 27th to 28th day of development. The remaining two had died at approximately the 31st to 33rd day.

Nest #42 - Total 4 eggs

Two eggs found to be infertile. The remaining two embryos had both died at approximately the 28th to 29th day of development.

Nest #43 - Total 5 eggs

Two eggs hatched. Of the remaining three eggs, two were infertile. The other contained an embryo that had died at approximately 31-33 days of development.

Embryological Studies, continued

Nest #44 - Total 4 eggs

One egg found to be infertile. The three remaining eggs contained embryos which had died at approximately the 31st to 33 rd day of development.

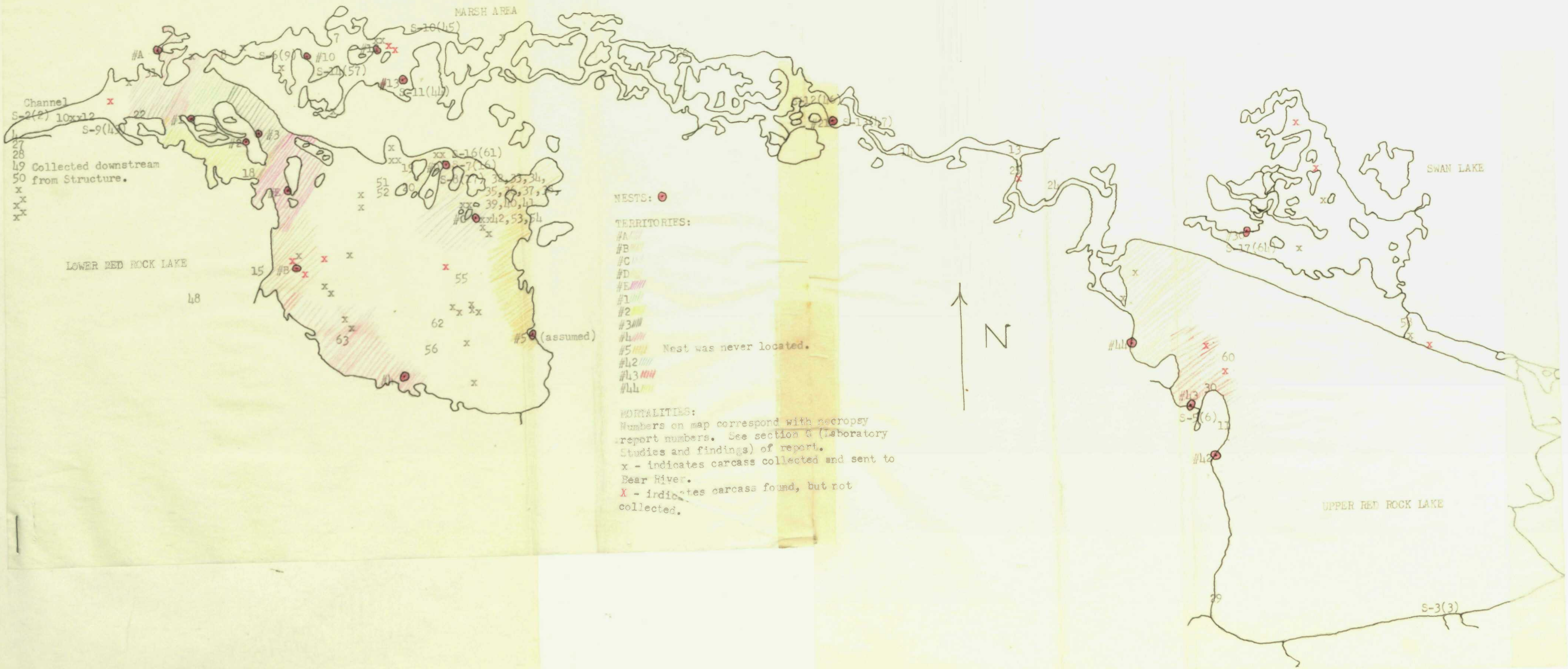
From the data compiled, the following can be noted:

1. Had there been 100% hatching success there would have been a 50% hatching success ratio.

2. Most of the embryos had reached what could be classed as minimal full term for incubation.

3. The above data correlates very closely with the data compiled from the eggs previously studied (i.e., those from the artificial incubation program).

Embryos from two of the eggs were autopsied, but no valuable information was gained because of their having been dead for a period of time. All bacterial growth was presumed to be of the type associated with decay.


MARSH AREA
Channel
Collected downstream
from Structure.
LOWER RED ROCK LAKE
(assumed)
SWAN LAKE
UPPER RED ROCK LAKE
N
NESTS:
TERRITORIES:
#A
#B
#C
#D
#E
#1
#2
#3
#4
#5 Nest was never located.
#42
#43
#44
MORTALITIES:
Numbers on map correspond with necropsy
report numbers. See section G (Laboratory
Studies and findings) of report.
x - indicates carcass collected and sent to
Bear River.
X - indicates carcass found, but not
collected.

VI. PUBLIC RELATIONS

A. Recreational Uses

Refuge visitation by sightseers, campers, and bird watchers was high this year. It is the highest it has been for the past four years.

Hunting and fishing brought record numbers of people to the refuge. Fishing on refuge waters did not peak until July due to poor roads in May and June. Fishing pressure subsided in September and October with the season closing November 30.

Hunting was permitted on the north side of the refuge for antelope. This, along with an open fall which permitted a longer waterfowl hunting season, increased hunting on the refuge considerably over past years.

Following is listed a breakdown of visitor use days as compared to last year:

		1964	1963
Hunting	-	1,310	400
Fishing	-	950	700
Micellaneous	-	3,720	3,000
Totals		5,980	4,100

B. Refuge Visitors

Although visitor use of the refuge was high this year, in proportion to other years, fewer stopped at refuge headquarters. Following are listed some of the refuge visitors:

Name	Organization	Purpose	Date
Mrs. Wagner	Lakeview School	Refuge operations	3/10
Jim Faust	Red Rock School	" "	3/10
Bob Twist	B.S.F.W.	Photography	4/20
J.L. Hope	Montana State U.	Collect specimens	5/15
Micheal Philley	" " "	" "	5/15
S. C. Schiff	" " "	" "	5/15
Jack Allen	B.S.F.W.S.	Swan Mortality Study	5/16
Dr.Wayne Jensen	B.S.F.W.S.	" " "	5/16
Mrs Holderness	Nicholia school	Field trip	5/25
Dave Marshall	B.S.F.W.S.	Biological Inspection	6/
Ray Glahn	B.S.F.W.S.	Waterfowl census	6/
W.H.Berry	Office of the Sec.	Soil & Moisture Insp.	6/23
George Wiseman	B.S.F.W.S.	" " "	6/23
E.R.Lumb	B.S.F.W.S.	" " "	6/23
Jim Clark	B.L.M.	Courtesy Call	6/25
Henry Noldon	B.L.M.	" "	6/25
E. Hilger	County Assessor	Refuge Grazing	6/30

Refuge Visitors, continued

Name	Organization	Purpose	Date
Dr. Wayne Jensen	B.S.F.W.S.	Swan Mortality	7/7
Dr. Loveless	B.S.F.W.S.	" "	7/7
J. Vanden Akker	B.S.F.W.S.	O. & M. Inspection	7/8
Burton Rounds	B.S.F.W.S.	Courtesy Call	7/11
John Wendler	B.S.F.W.S.	" "	7/11
R.R. Hoffman	B.S.F.W.S.	" "	7/20
Ed White	B.S.F.W.S.	" "	7/20
Ray Glahn	B.S.F.W.S.	Waterfowl Census	7/21
Bob Twist	B.S.F.W.S.	" "	7/21
Eugene Clark	Mont. Fish & Game	Game Law Enforcement	7/24
Lowell Beddulph	N.P.S.	Courtesy Call	7/29
Alma Teuscher	"	" "	7/21
W. J. Bolte	"	" "	8/3
Willis Peterson	Arizona Highways	Photography	8/5
Ray Glahn	B.S.F.W.S.	Swan Census	8/10
J.H. Sather	Western Illinoise U.	Courtesy Call	8/14
Earl Love	S.C.S., Dillon	Agreements	8/18
C.A. Krall	S.C.S., Butte	Refuge Range Insp.	8/18
P. T. Petersen	Simplot Co.	Inspect Simplot Mines	8/20
W. Mueller	U.S.F.S.	" " "	8/20
Richard Gritman	B.S.F.W.S.	Swan Mortality	8/28
Jack Allen	B.S.F.W.S.	" "	9/25
Pank Defendorf	B.S.F.W.S.	Quarters Survey	10/26
Eugene Crawford	B.S.F.W.S.	Refuge evaluation	10/30
John L. Sincock	B.S.F.W.S.	" "	10/30
Charles Hughlett	B.S.F.W.S.	" "	10/30
Kenneth MacDonald	B.S.F.W.S.	" "	11/30
Robert Needham	Mont. Fish & Game	Fishing regulations	11/4
John Gaffney	" " "	" "	11/4
Joseph Egan	" " "	Hunting Regualtions	12/11
Jerry Ridgeway	B.S.F.W.S.	Fox Control	12/15
Ed Spry	Government trapper	" "	12/15

C. Refuge Participation

Acting manager Devan and Gibbons attended a meeting June 11 at Stahley Springs Lodge, Idaho sponsered by the sportsmen groups of southeastern Idaho. This meeting was called to organize a Trumpeter Swan Protective Association for the Island Park area in Idaho.

The organization of the association was an outcome of the shooting incident which occurred at Island Park, Idaho killing two Trumpeter Swan. The film, The Trumpeter Swan was shown to the group.

Refuge Participation, continued

On August 21 four African students accompanied by a Yellowstone Park Ranger visited the refuge as part of the African Student Conservation Training Program.

The students were shown a film on the swan and taken on a tour of the refuge by Acting Manager Gibbons and Assistant Howard.

Assistant Manager Howard, on September 9, made a range tour of Beaverhead County. The tour was sponsered by the Soil Conservation Service, Forest Service, and the Bureau of Land Management.

Refuge Mechanic Ray Hotchkiss attended the Kaiser Jeep Corporation Service Trainigg School at Billings, Montana on November 4. The lectures and demonstrations covered the newer "Jeep" products of which we have several.

On December 7, Acting Manager Gibbons attended the Annual Agricultural Conservation Program Development meeting in Dillon, Montana. This meeting was concerned principally with conservation development programs in Beaverhead County.

D. Hunting

The opening of the north side of the refuge to antelope hunting for the first time greatly increased the hunting pressure on the refuge. On the basis of bag checks, 25 antelope were taken on the refuge. A few head of cattle were reported shot on the refuge in the hunting area.

An open fall allowed a longer waterfowl hunting season than is normal for this refuge. A good degree of success was enjoyed by the hunters as duck populations were high.

The opening of 9000 acres of refuge to antelope hunting apparently acted like a "magnet" in drawing hunters to the refuge. In the opinion of many hunters, the refuge harbored great numbers of antelope and its opening would certainly mean their hunting success. However, this opinion is not entirely true in that the refuge does not restrict antelope movement either onto or away from its lands.

Our estimated peak population of antelope on the refuge was 650 and this population was present at the time of the hunting season. The fact that only 25 antelope were harvested on the refuge would attest to the fact that hunting on the refuge was no different than hunting any place else in the valley where antelope habitat exists. Perhaps when the "new" wears off, hunting pressure per acre on the refuge in relation to hunting pressure per acre throughout the valley will be no greater. The State issued 2,000 antelope hunting permits, for the management area (33).

E. Violations

None

VII. OTHER ITEMS

A. Items of Interest

A pair of nesting Trumpeter Swan were shot on Swan Lake in Island Park, Idaho on May 6, 1964. This pair of swan had nested about 200 yards from U.S. Highway 191 for the past several years and had become a tourist attraction, and perhaps the most well known and observed wild Trumpeters in the country.

Their loss aroused citizens of southeastern Idaho, who held these birds in high esteem, to raise over $600 for information leading to the arrest and conviction of the person responsible for the shooting.

U. S. Game Management Agent Rush arrested an Idaho Falls youth for the shooting. He was sentenced to work for the Idaho Fish and Game Department for one month, plus pay a small penalty fine.

The eggs salvaged from the nest were brought to this refuge where they were placed in the incubator. After sufficient time had elasped for hatching to have taken place, the eggs were broken and the embryos found to have died at about the stage of development when the parent bird was killed.

Another pair of Trumpeters have been interested in the small marsh, Swan Lake, and perhaps will eventually nest.

The United States Coast and Geodetic Survey ran a set of levels from West Yellowstone into the Centennial Valley with one party and at the same time with another party, ran a line from Lima - both parties meeting near Odell Creek.

These lines were to establish new elvation in the valley after the 1959 earthquake had altered the old stations.

One bronze cap was set at the base of the flag pole at refuge headquarters, but as of this date no elevation has been placed on it.

The oil well drilling rig that was operating near Lima Reservoir gave up this past fall, dismantled the rig, and moved out.

Refuge Biologist G. A. Devan , who had been Acting Refuge Manager since July of 1963, transferred to the Ravalli N. W. Refuge July 27, 1964. Mr Devan assumed the Refuge Manager position on this newly established refuge.

Mr Lynn Howard, Assistant Manager from Malheur Refuge, was on temporary assignment at this refuge from August 4th to October 12, 1964. Mr Howards activities were principally to aid in refuge operations. His help in conducting the national Trumpeter Swan inventory was greatly appreciated.

Items of Interest, continued

Mr Eldon McLaury entered on duty December 14, 1964 as Wildlife Management Biologist. Mr McLaury hails from Lakeview, Oregon where he had been with the Bureau's Range Survey crew.

Clerk-typist, Robert Langdon resigned October 2, 1964 to accept employment in Dillon, Montana.

B. Photographs

Appear at end of report.

C. Acknowledgements

Charles W. Gibbons	I. General
	II. Wildlife
	III. Refuge Development
	IV. Resource Management
	V. A. Grayling Study
	VI. Public Relations
	VII. Other Items
Eldon McLaury	II. Graph
John Monarch	V. B. Swan Incubation
	C. Swan Mortality Study
Lynn Howard	II. A. National Swan Survey
Katie L. Hotchkiss	Typing and Editing

SIGNATURE PAGE

Submitted by:

Charles W. Gibbons
(Signature)

Charles W. Gibbons

Acting Refuge Manager
(Title)

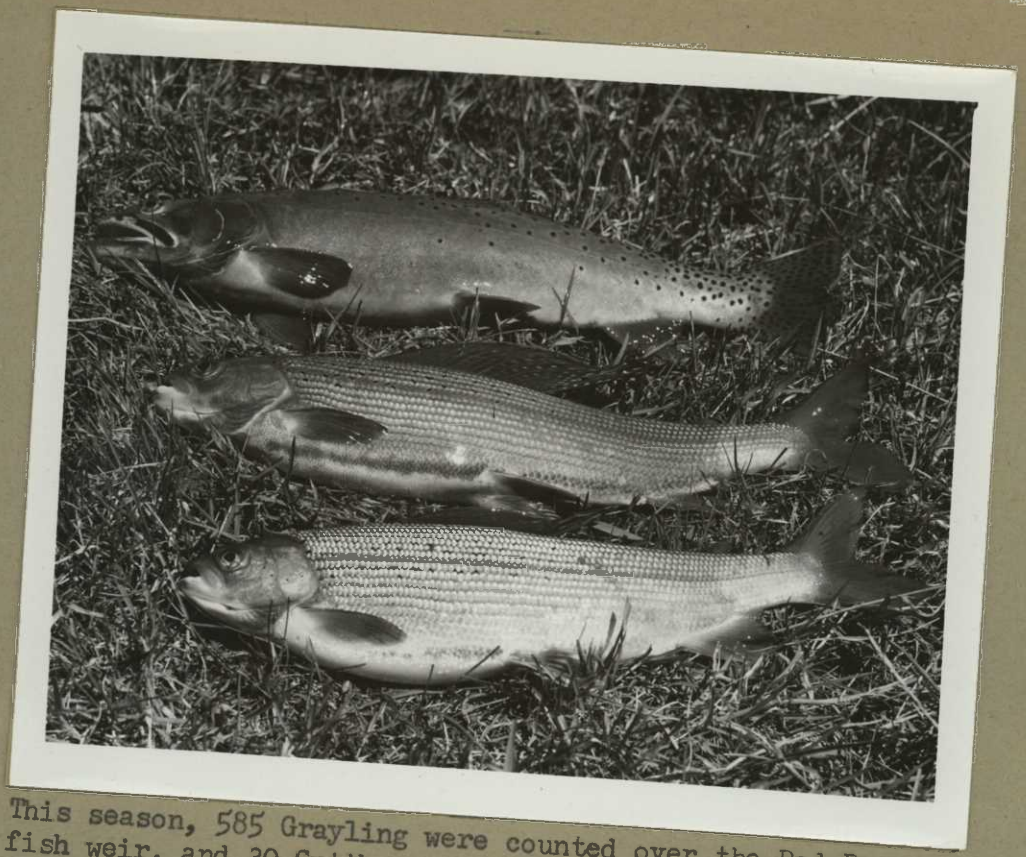
Date: January 21, 1965

Approved, Regional Office:

Date: FEB 17 1965

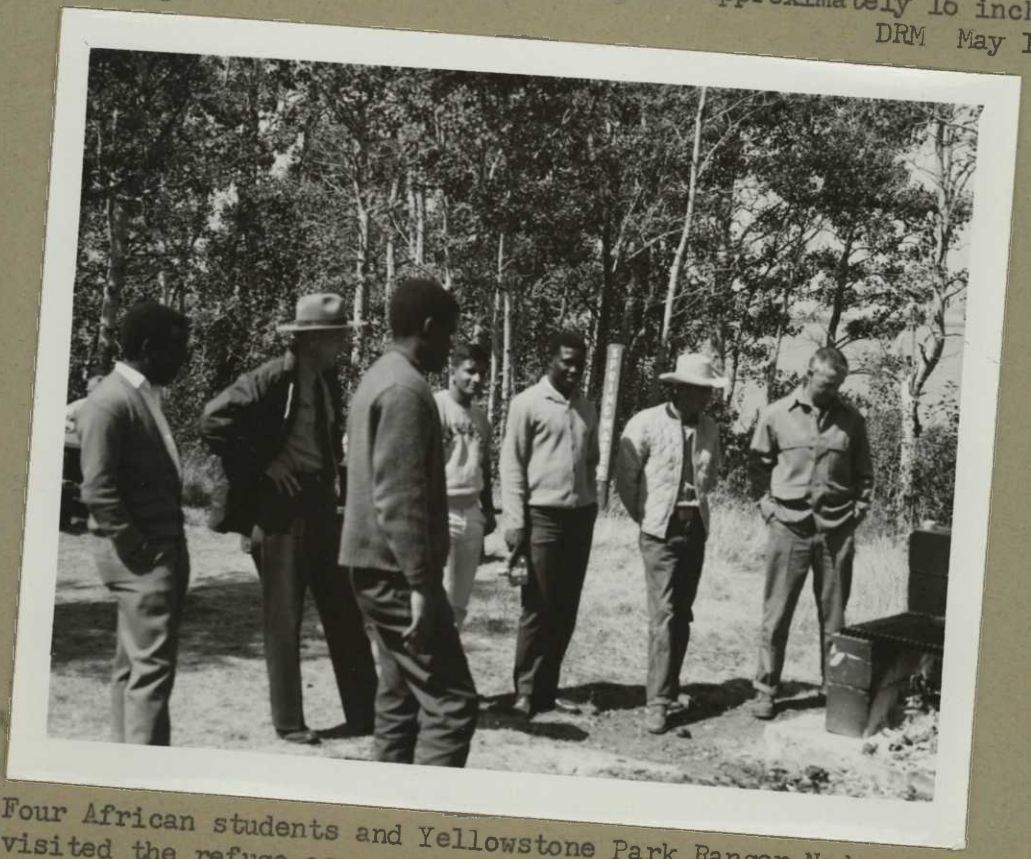
A. Nelson Edwards
(Signature)

Acting Chief, Division of Wildlife
(Title)



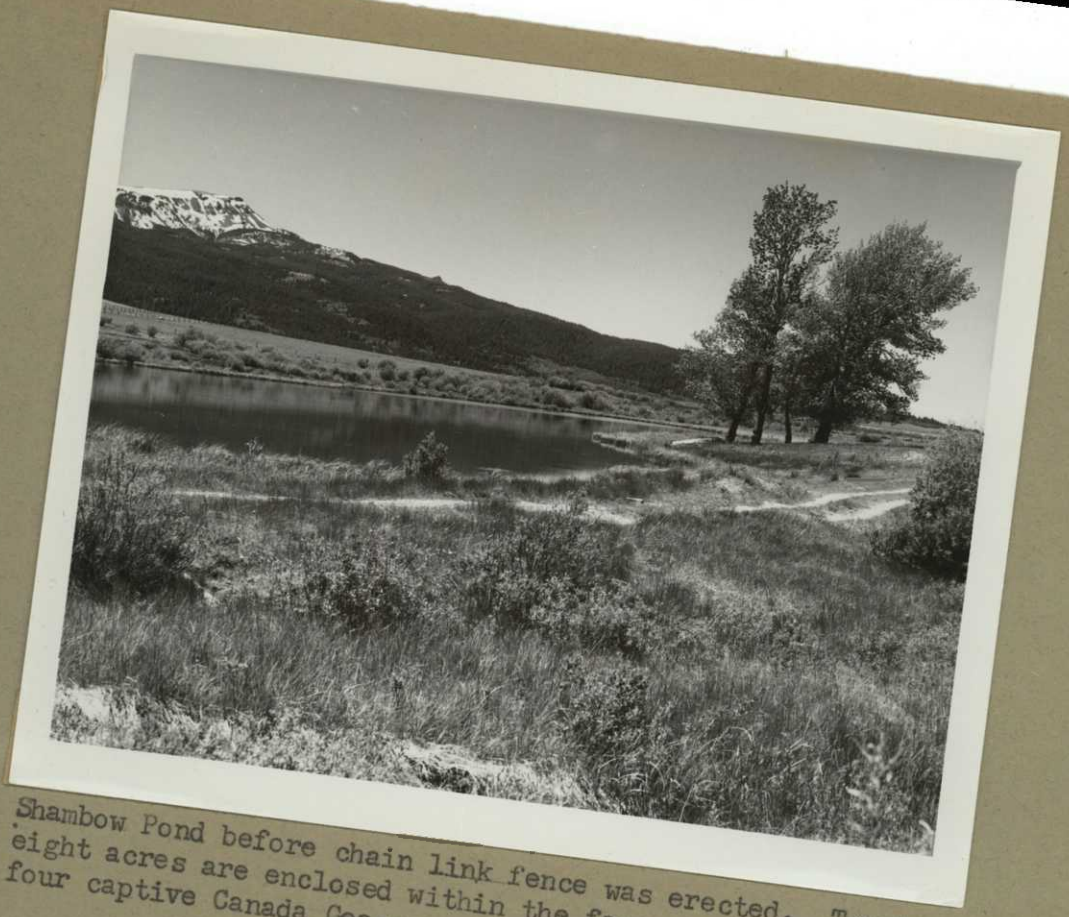
This season, 585 Grayling were counted over the Red Rock Creek fish weir, and 30 Cutthroat Trout. 725 Suckers were removed. Photo shows a male Cutthroat (top), and a male and a female Grayling (female bottom). Grayling are approximately 16 inches in length.

DRM May 1963



Four African students and Yellowstone Park Ranger Nadon visited the refuge as part of the African Student Conservation Training Program. Here, Assistant Manager Lynn Howard and Maintenanceman John Rebar stand with the group at the campground where lunch was served.

CWG Aug. 1964



Shambow Pond before chain link fence was erected. Twenty eight acres are enclosed within the fence where we now have four captive Canada Geese.
CWG June 1963

This stile was constructed over the chain link fence to allow visitors access to photo blind. The main gate was locked to prevent accidental loss of geese.
CWG Aug. 1964

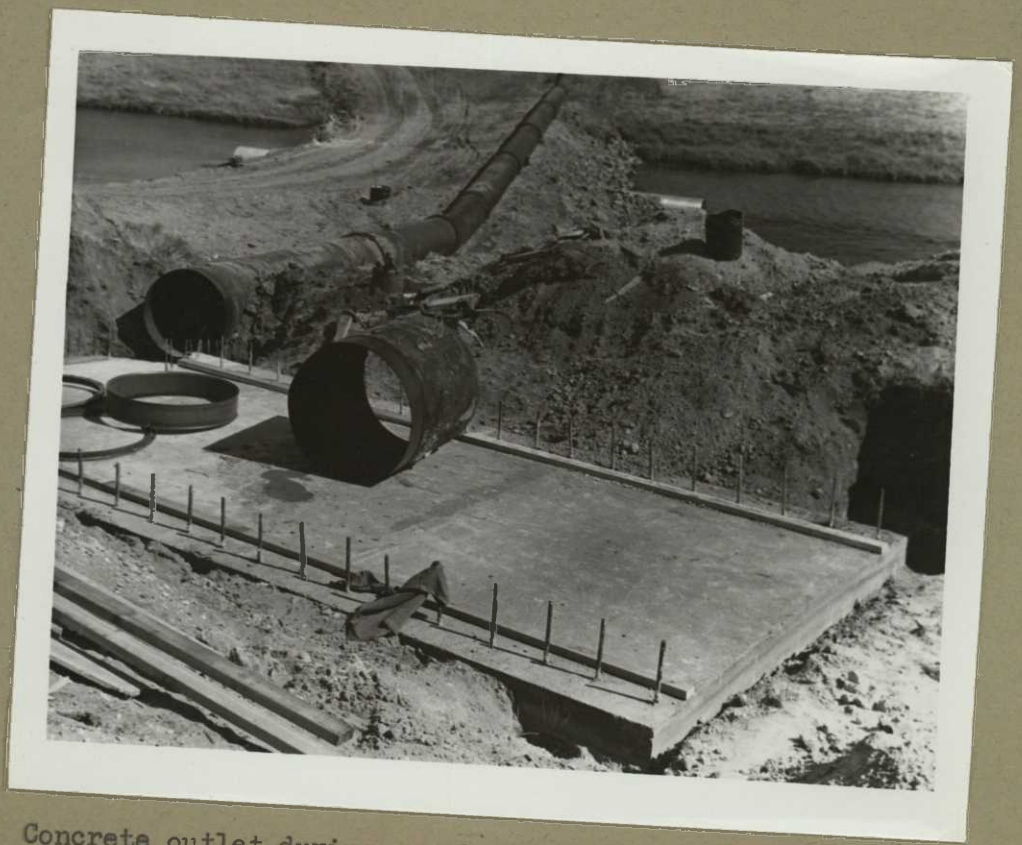
Swing gate and rustic jack fence constructed at east side of Shambow Pond enclosure. Gate allows access to refuge hay unit seen in background. CWG Aug.1964

View of refuge headquarters with Managers residence and service building. Plans have been submitted for renovation of the service building into additional office space and visitor center. CWG July 1963

Placing a 30 foot section of pipe with aid of dragline. Installation of the inverted siphon was principal development project accomplished this year. CWG Aug. 1964

Siphon is 286 feet in length and 3 feet in diameter. Designed to handle 15 C.F.S. flow, the siphon conveys water across Elk Springs Creek and onto refuge unit 15 G irrigating approximately 1750 acres. CWG Aug.1964

Foreman Breneman removes tar so coupler can be properly fitted to insure against leakage. CWG Aug. 1964



Concrete outlet during construction showing reinforcing steel used to insure against breakage. Rock fill that pipe rests on, required 1,000 yards of material. Rock was used to avoid settlement. CWG Aug. 1964

Inlet and outlet structure completed. The bottom elevation of the outlet (lower photo) is 6 inches lower than the bottom elevation of the inlet - thus causes water to flow through the pipe.

CWG Sept. 1964

Inlet and outlet structures of inverted siphon while in operation. (Inlet, top photo)

CWG Oct. 1964

Assistant Howard surveying ditch bottom to insure proper gradient has been attained. This canal takes water from Culver Pond to the siphon. CWG Sept. 1964

Foreman Breneman operating D-7 borrowed from Camas Refuge. This machine enabled us to finish this canal and construct Picnic Creek Dam before winter. CWG Sept. 1964

Picnic Creek Dam nearing desired height. This impoundment was constructed where Picnic Creek enters Elk Springs Creek and creates a pond of about 250 - 300 surface acres. CWG Sept. 1964

Rip-rapping Picnic Creek Dam to prevent erosion by wind action. Rock was obtained near Elk Lake, where we constructed a loading trap to speed up hauling. CWG Oct.1964

Future nesting island. When objective water level has been reached in the Picnic Creek impoundment, approximately two feet of water will be in this area.
Eight islands have been made and four more are planned.
CWG Oct. 1964

The grates serve to stop fish movement into the irrigation ditch that goes from Culver Pond to the siphon as well as to stop trash and debris.

CWG Oct. 1964

Five impoundments in refuge unit 13G built the summer of 1962 under Job # 2 of the ten year Soil and Moisture Development Program. Ditch to the right in the photo conveys water to Culver Pond where it is further conveyed to refuge unit 15G via the siphon. Glahn July 1964


SS-II-42

Culver Pond is in the background, and one of the larger soil and moisture program impoundments is in the foreground. Range forage has increased greatly due to irrigation and the raised water table. Cattle distribution is better now that water is available in all sectors of unit 13 G.

Glahn July 1964


SS-II-45

Another impoundment in 13 G located near the county road and on what is known as Culver Slough. This pond had considerable waterfowl use including Trumpeter Swan. Nesting islands are planned for this pond as well as several others. Next year impounding in 13 G will be completed with another 8 impoundments planned.

Glahn July 1964


SS-II-39

3-1750
Form NR
(Rev. March 1953)

WATERFOWL

REFUGE Red Rock Lakes MONTHS OF January 5 TO May 2, 1964

(1) Species	(2) Weeks of reporting period: 1-5/1-11 (1)	1-12 (2)	1-19 (3)	1-26 (4)	2-2 (5)	2-9 (6)	2-16 (7)	2-23 (8)	3-1 (9)	3-8 (10)
Swans:										
Whistling										
Trumpeter	171	197	197	200	200	112	150	215	219	234
Geese: Swan Total	171	197	197	200	200	112	150	215	219	234
Canada	35				9	12		14	12	11
Cackling										
Brant										
White-fronted										
Snow										
Blue										
~~Other~~ Total *Geese*	35				9	12		14	12	11
Ducks:										
Mallard	1,400	1,000	1,000	800	800	800	800	800	1,000	1,000
Black										
Gadwall										
Baldpate	35	200	200	300	300	300	200	200	200	200
Pintail										
Green-winged teal										
Blue-winged teal										
Cinnamon teal										
Shoveler										
Wood										
Redhead										
Ring-necked										
Canvasback										
Scaup	800	500	500	400	400	400	300	300	300	300
Goldeneye	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,200	1,200
Bufflehead	500	400	300	300	200	200	200	200	200	200
Ruddy										
~~Other~~ Total *Ducks*	4,235	3,600	3,500	3,300	3,200	3,200	3,000	3,000	2,900	2,900

3 -1750a
Cont R-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Red Rock Lakes MONTHS OF January 5 TO May 2, 19 64

(1) Species	(2) Weeks of reporting period: 3-15 11	3-22 12	3-29 13	4-5 14	4-12 15	4-19 16	4-26 17	18	(3) Estimated waterfowl days use	(4) Production: Broods seen	Estimated total
Swans:											
Whistling											
Trumpeter	277	230	250	250	250	225	225		25,214		
Geese: Swan Total	277	230	250	250	250	225	225		25,214		
Canada	14	14	50	300	300	200	200		8,197		
Cackling											
Brant											
White-fronted											
Snow											
Blue											
~~Other~~ ##### Total Geese	14	14	50	300	300	200	200		8,197		
Ducks:											
Mallard	1,200	1,200	1,400	1,400	2,000	2,000	2,000		144,200		
Black											
Gadwall		30	30	100	100	300	300		6,020		
Baldpate	250	300	200	200	300	300	500		29,295		
Pintail		50		100	300	500	700		11,550		
Green-winged teal		10	50	50	100	100	200		3,570		
Blue-winged teal							20		140		
Cinnamon teal						10	10		140		
Shoveler							50		350		
Wood											
Redhead				200	200	700	800		13,300		
Ring-necked				50	50	100	100		2,100		
Canvasback						200	200		2,800		
Scaup	300	300	300	500	500	500	800		51,800		
Goldeneye	1,200	1,200	1,200	1,200	1,200	1,200	1,200		159,600		
Bufflehead	200	200	200	200	300	300	400		31,500		
Ruddy				20	100	300	800		8,540		
Other											
Total Ducks	3,150	3,290	3,380	4,020	5,150	6,510	8,080		464,905		
Coot:											
		10	10	30	100	300	500		6,650		

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	25,214	277	
Geese	8,197	300	
Ducks	164,905	8,080	
Coots	6,650	500	

SUMMARY

Principal feeding areas MacDonald and Culver Ponds

Principal nesting areas

Reported by G.A. Devan, Wildlife Mgt. Biologist

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C.
1953

3-1750
Form NR
(Rev. March 1953)

WATERFOWL

REFUGE Red Rock Lakes MONTHS OF May thru August, 19 64

* Aerial count

(1) Species	(2) Weeks of reporting period: 4/27-5/2 (1)	5/3 (2)	5/10 (3)	5/17 (4)	5/24* (5)	5/31 (6)	6/7 (7)	6/14* (8)	6/21 (9)	6/28 (10)
Swans:										
Whistling										
Trumpeter	200	175	175	200	247	247	250	237	250	250
Geese: Swan Total	200	175	175	200	247	247	250	237	250	250
Canada	200	100	75	100	100	75	200	250	350	700
Cackling										
Brant										
White-fronted										
Snow										
Blue										
##### Total Geese	200	100	75	100	100	75	200	250	350	700
Ducks:										
Mallard	2,000	2,000	2,000	1,000	1,500	1,200	1,200	1,200	1,200	1,400
Black										
Gadwall	300	300	300	500	500	500	500	500	500	800
Baldpate	300	500	500	300	500	500	700	800	1,000	1,000
Pintail	600 500	500	500	500	500	500	500	800	800	1,000
Green-winged teal	200	200	250	250	250	250	250	300	400	500
Blue-winged teal					50	100	100	200	400	400
Cinnamon teal					50	50	50	100	100	100
Shoveler	50	100	100	200	300	300	300	400	400	400
Wood										
Redhead	800	800	800	1500	1500	1500	1500	1500	1500	1500
Ring-necked	100	100	100	200	200	200	200	200	200	200
Canvasback	200	100	100	400	400	400	400	500	500	400
Scaup	800	600	600	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Goldeneye	1,200	1,200	1,200	1,500	1,500	1,000	1,000	1,000	1,000	1,000
Bufflehead	400	400	400	500	500	500	500	500	500	500
Ruddy		200	100	300	300	300	300	400	500	500
Other										
Total Ducks	6,950	7,000	6,950	8,150	9,050	8,300	8,500	9,400	10,000	10,700
White Pelican		10	25	100	200	250	250	250	20	210
Coot	500	700	800	1000	3000	3500	3500	4000	4000	4000

3 -1750a
Cont R-1
(Rev. arch 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Red Rock Lakes MONTHS OF May thru ~~XX~~ August , 19 64

(1) Species	(2) Weeks of reporting period: 7/5 (11)	7/12 (12)	7/19* (13)	7/26 (14)	8/2 (15)	8/9* (16)	8/16 (17)	8/23 (18)	(3) Estimated waterfowl days use	(4) Production: Broods seen	Estimated total
Swans:											
Whistling											
Trumpeter	270	275	283	280	275	266	266	265	30,877	11	24
Geese: Swan Total	270	275	283	280	275	266	266	265	30,877	11	24
Canada	1,000	800	500	375	250	150	150	150	38,675	19	100
Cackling											
Brant											
White-fronted											
Snow											
Blue											
~~Other~~ ##### Total Geese	1,000	800	500	375	250	150	150	150	38,675	19	100
Ducks:											
Mallard	2,000	2,000	2,000	2,200	2,500	2,600	7,500	15,000	353,500	125	725
Black											
Gadwall	1,000	1,500	2,500	2,200	2,000	1,900	5,000	15,000	250,600	25	200
Baldpate	1,200	10,000	18,000	19,000	19,000	20,000	30,000	40,000	1,143,100	16	110
Pintail	800	600	500	500	500	500	5,000	7,500	154,700	5	40
Green-winged teal	500	500	500	750	1,000	1,000	900	750	61,250	25	250
Blue-winged teal	400	400	400	500	600	750	1,000	1,000	44,100	20	200
Cinnamon teal	100	100	100	150	200	300	500	1,000	20,300		
Shoveler	400	400	400	400	500	1,000	1,200	1,500	58,450		
Wood											
Redhead	1,500	1,500	1,500	1,000	800	800	2,500	5,000	192,500	60	1200
Ring-necked	200	200	200	200	500	750	750	500	35,000	2	30
Canvasback	400	200	200	200	200	100	1,000	2,000	53,900	15	200
Scaup	1,000	1,000	1,000	1,500	2,000	2,500	3,500	4,000	178,500	30	1750
Goldeneye	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	137,200		
Bufflehead	500	400	200	400	400	500	600	750	59,150		
Ruddy	500	500	500	400	300	300	700	1,000	49,700	20	350
Other											
Total Ducks	11,500	20,300	29,000	30,400	31,500	34,000	61,150	96,000	2781,950	343	5055
White Pelican	150	150	150	100	75	0			13,580		
Coot:	4,000	4,500	5,300	5,500	6,000	6,500	7,500	10,000	520,100	75	3,300

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	30,877	283	24
Geese	38,675	1,000	100
Ducks	2,791,950	96,000	5,055
Coots	520,100	10,000	3,300

SUMMARY

Principal feeding areas Swan Lake, Upper and Lower Red Rock Lakes, River, and marsh area.

Principal nesting areas Swan Lake, Lower Lake, River, and marsh area.

Reported by Lynn C. Howard, Assistant Manager

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C.
1953

3-1750
Form NF
(Rev. March 1953)

WATERFOWL

REFUGE Red Rock Lakes MONTHS OF September TO January, 1964

(1) Species	(2) Weeks of reporting period: 8/30 1	9/6 2	9/13 3	9/20 4	9/27 5	10/4 6	10/11 7	10/18 8	10/25 9	11/1 10
Swans:			Aerial			Aerial			150	1,350
Whistling										
Trumpeter	250	250	202	202	200	173	190	190	200	205
Swan total	250	250	202	202	200	173	190	190	350	1,555
Geese:										
Canada	150	150	150	150	150	105	100	150	150	150
Cackling										
Brant										
White-fronted										
Snow										
Blue										
~~Other~~ Total Geese	150	150	150	150	150	105	100	150	150	150
Ducks:										
Mallard	8,000	9,000	10,000	12,000	5,000	1,500	1,500	2,000	2,500	2,500
Black										
Gadwall	7,000	8,000	9,000	9,000	4,500	150	150	100	100	100
Baldpate	40,000	40,000	30,000	35,000	20,000	14,000	13,000	10,000	10,000	8,000
Pintail	4,000	4,500	5,000	6,000	3,000	1,700	1,500	1,000	1,000	800
Green-winged teal	750	800	900	1,000	600	300	300	150	100	50
Blue-winged teal	1,000	900	750	600	400	250	250	100	50	50
Cinnamon teal	1,000	800	600	500	400	250	250	150	100	50
Shoveler	1,500	2,000	2,200	2,500	1,500	350	300	200	100	50
Wood										
Redhead	5,000	6,000	6,500	7,500	4,000	2,100	2,100	1,500	1,500	1,500
Ring-necked	350	400	500	500	300	150	200	100	100	100
Canvasback	2,000	2,000	1,500	1,500	700	150	200	150	150	100
Scaup	4,000	3,500	3,000	2,500	1,500	1,000	1,200	1,000	1,000	1,000
Goldeneye	1,000	1,000	1,000	1,000	500	100	200	500	600	600
Bufflehead	1,000	1,500	2,000	2,000	1,000	250	200	100	200	200
Ruddy	1,000	700	500	500	300	100	100	100	100	50
Other										
Total Ducks	77,600	81,100	73,450	82,100	43,700	22,350	21,450	17,150	17,600	15,150
Coot:	10,000	10,000	10,000	10,000	17,000	24,000	20,000	15,000	12,000	8,000

Int. Dup. Sec.,
Wash., D. C. 37944

3 -1750a
Cont. N[illegible]l
(Rev. M[illegible]ch 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Red Rock Lakes MONTHS OF September TO January, 19 64

(1) Species	(2) Weeks of reporting period: Freeze Up → 11-8 / 11	11-15 / 12	11-22 / 13	11-29 / 14	12-6 / 15	12-13 / 16	12-20 / 17	12-27 / 18	(3) Estimated waterfowl days use	(4) Production: Broods seen	(4) Production: Estimated total
Swans:											
Whistling	875								16,625		
Trumpeter	201	3	126	118	271	270	328	300	25,753		
Geese: Total Swans	1,076	3	126	118	271	270	328	300	42,378		
Canada	150	4	4	4	5	4	4	54	11,438		
Cackling											
Brant											
White-fronted											
Snow											
Blue											
Other											
Ducks: Total Geese	150	4	4	4	5	4	4	54	11,438		
Mallard	600	200	300	400	450	800	900	900	409,850		
Black											
Gadwall	20								266,840		
Baldpate	80	50	75	75	100	175	175	200	1,546,510		
Pintail	20	20	20						199,920		
Green-winged teal	20								34,790		
Blue-winged teal									30,450		
Cinnamon teal	10								28,770		
Shoveler									74,900		
Wood											
Redhead	150	10							265,020		
Ring-necked	50								19,250		
Canvasback	25								59,325		
Scaup, Lesser	50	10			25	25	25	25	139,020		
Goldeneye	600	800	900	1,000	1,000	1,075	1,050	1,050	97,825		
Bufflehead	200	50	50	75	50	130	130	130	64,855		
Ruddy	50								24,500		
Other											
Total Ducks	1,875	1,140	1,345	1,550	1,625	2,205	2,180	2,305	3,261,825		
Coot:	200								953,400		

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	42,378	1,555	
Geese	11,438	150	
Ducks	3,261,825	82,100	
Coots	953,400	24,000	

SUMMARY

Principal feeding areas Culver and MacDonald ponds from November 20, 1964 to date.

Principal nesting areas

Reported by Eldon L. McLaury, Wildlife Mgmt. Biologist

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C.
1953

INT.-DUP., D.C.-53824-59

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge RED ROCK LAKES Months of January to April 1964

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Horned grebe	2	4-8	6	4-29	Still present					10
Great blue heron	14	3-30	22	4-11	Still present					30
Sandhill crane	2	4-3	22	4-29	Still present					35
II. Shorebirds, Gulls and Terns:										
Wilson's snipe	1	3-16	4	4-11	Still present					50
Killdeer	1	3-2	6	4-29	Still present					50
California gull	1	3-2	40	4-29	Still present					150
Western willet	1	4-13	1	4-29	Still present					10
Long-billed curlew	2	4-20	2	4-29	Still present					10

(over)

(1)	(2)		(3)		(4)		(5)	(6)
III. Doves and Pigeons:								
Mourning dove	1	4-24	1	4-24	1	4-24		10
White-winged dove								
IV. Predaceous Birds:								
Golden eagle	Present all period		7	1-27	Still present			12
Duck hawk	1	4-21		4-21		4-21		2
Horned owl	Present all period				Resident			20
Magpie	Present all period				Resident			200
Raven								
Crow	4	3-30	100	4-29	Still present			150
Bald eagle	1	4-9	1	4-29	1	4-29		2
Red-tailed hawk	1	3-23	2	4-17	Still present			8
Swainson's hawk	1	4-17	2	4-29	Still present			6
Ferruginous hawk	1	4-13	2	4-21	Still present			6
Rough-leg hawk	1	4-13	1	4-21	Still present			6
Sharp-shinned hawk	1	4-23	1	4-23	1	4-23		2
Sparrow hawk	1	4-9	6	4-29	Still present			10
Marsh hawk	1	3-23	3	4-21	Still present			12

Reported by G.A.Devan,
Wildlife,Mgt. Biol.

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

INT.-DUP. SEC., WASH., D.C.

36104

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge RED ROCK LAKES Months of May thru ~~xx~~ August 1964

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Horned grebe	Since last period		175		Still present					175
Eared grebe	1	5-2	400	August	Still present					400
Western grebe	7	5-21	350	August	Still present				80	350
Pied-billed grebe	5	8-10	50	August	Still present					50
White pelican	12	5-3	250	July	75	8-3		Non-breeders		Drifters
Great blue heron	Since last period		70	June	Still present		2	20	34	110
Black crowned night heron	1	5/20	20	July	Still present					20
American bittern	1	6-17	25	August	Still present					25
Sandhill crane	Since last period		187	June	146	8-14			3 observed	300
II. Shorebirds, Gulls, Terns:										
Common Snipe	Since last period		350	August	Still present					350
Killdeer	Since last period		400	August	Still present					400
Spotted sandpiper	21	8-21	300	August	Still present					300
Long-billed curlew	Since last period		150	June	Still present					150
Western willet	Since last period		200	August	Still present					200
~~Yellow legs, greater~~	1	6-5	100	August	Still present					100
~~Yellow legs, lesser~~	15	8-21	100	August	Still present					100
Western sandpiper	4	5-12	100	August	Still present					100
Marbled godwit	None observed									
Avocet	6	5-13	200	July	Still present					200
Wilson's phalarope	4	5-23	200	July	Still present					200
Northern phalarope	None observed									
California gull	Since last period		300	June	Still present					300
Ring-billed gull	Since last period		25	June	Still present					50
Forster's tern	11	5-23	100	June	Still present					100
Common tern	2	5-23	300	July	Still present					300
Black tern	1	5-19	100	June	61	8-27				100

(over)

(1)	(2)		(3)		(4)	(5)	(6)
III. Doves and Pigeons:							
Mourning dove	9	6-3	100	July	Still present		100
White-winged dove							
IV. Predaceous Birds:							
Golden eagle	Since last period		2	July	Still present		
Duck hawk	2	8-6	10	August	Still present		
Horned owl	Resident		10	?			
Magpie	Resident		100	Resident	Still present		
Raven			100	Resident	Still present		
Crow	Since last period		150	July			
Bald eagle	1	6-3	1	6-3			-
Pigeon hawk	1	6-3	2	6-25			-
Cooper's hawk	1	5-15	4	6-20			
Prairie falcon	None this period						
Swainson's hawk	Since last period		6	June	Still present		
Red-tailed hawk	Since last period		10	July	Still present		
Sparrow hawk	Since last period		50	August	Still present		
Marsh Hawk	Since last period		20	July	Still present		
Goshawk	1	5-12	1	May	Still present		
Rough-leg hawk	Since last period		3	June	Still present		
Ferruginous hawk	Since last period		2	June	Still present		

These bird groups use the refuge on and off-on basis.

Reported by Lynn C. Howard, Assistant Manager

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

INT.-DUP. SEC., WASH., D.C.

M17058

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl) thru

Refuge Red Rock Lakes Months of September ~~to~~ December 1954

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Horned grebe	Present from last period		Peak attained last period		35	10/26				175
Eared grebe	"	"	"	"	9	11/6				400
Western grebe	"	"	"	"	12	11/6				350
Pied-billed grebe	"	"	"	"	6	10/29				50
Great blue heron	"	"	"	"	1	10/9				110
Black crowned night heron	"	"	"	"	2	9/28				20
American bittern	"	"	"	"	1	9/28				25
Sandhill crane	"	"	"	"	40	9/15				300
II. Shorebirds, Gulls & Terns										
Killdeer	"	"	"	"	1	11/27				400
Common snipe	"	"	"	"	2	11/8				350
Long-billed curlew	"	"	"	"	3	9/22				150
Spotted sandpiper	"	"	"	"	6	10/1				300
~~II. Shorebirds, Gulls and Terns~~										
Western willet	"	"	"	"	2	9/18				200
Yellowlegs, greater	"	"	"	"	11	10/5				100
Yellowlegs, lesser	"	"	"	"	9	10/5				100
Western sandpiper	"	"	"	"	14	10/21				100
American avocet	"	"	"	"	3	10/15				200
Wilson's phalarope	"	"	"	"	2	10/15				200
California gull	"	"	"	"	1	11/27				300
Ring-billed gull	"	"	"	"	2	11/6				50
Forster's tern	"	"	"	"	1	9/18				100
Common tern	"	"	"	"	2	9/18				300

(over)

(1)	First Seen Numbers (2)	First Seen Date	Peak Numbers (3)	Peak Numbers Date	Last Seen Numbers (4)	Last Seen Date	(5)	Total Est. (6) No.
III. Doves and Pigeons:								
Mourning dove	Present from last period		Peaked last period		2	9/2		25
White-winged dove								
IV. Predaceous Birds:								
Golden eagle	Present all period							5
Duck hawk	Pres.from last per.		Peaked last period		?			2
Horned owl	Resident				1	12/29		50
Magpie	"							200
Raven	1	9/9	10	?	1	10/2		10
Crow	2	9/2	35	?	6	10/1		35
Pigeon hawk	Pres.from last per.				1	9/8		5
Cooper's hawk	"	"	5	?	1	12/31		5
Swainson's hawk	"	"	20	?	1	10/20		20
Red-tailed hawk	"	"	25		1	11/30		25
Sparrow hawk	"	"	Peaked last period		3	9/10		50
Marsh hawk	"	"	"	"	1	11/20		20
Goshawk	"	"	"	"	?	?		1
Rough-legged hawk	"	"	"	"		11/20		10
Ferruginous hawk	"	"	"	"	1	10/20		5

Reported by E.L.McLaury

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

INT.-DUP. SEC., WASH., D.C. 79858

3-1750b
Form NR-1B
(Rev. Nov. 1957)

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge RED ROCK LAKES For 12-month period ending August 31, 19 64

Reported by Lynn C. Howard Title Assistant Refuge Manager

(1) Area or Unit Designation	(2) Habitat Type	(2) Habitat Acreage	(3) Use-days	(4) Breeding Population	(5) Production
Upper Lake	Crops		Ducks 3,631,148	125	534
	Upland		Geese 49,124	0	0
	Marsh	20	Swans 26,021	12	6
	Water	2,880	Coots 349,762	64	224
	Total	2,900	Total 4,056,055	201	764
Lower Lake	Crops		Ducks 2,702,250	200	1,350
	Upland		Geese 3,467	12	55
	Marsh	340	Swans 8,673	24	0
	Water	1,200	Coots 462,185	198	693
	Total	1,540	Total 3,176,575	434	2,098
Swan Lake	Crops		Ducks 422,226	225	875
	Upland		Geese 654	6	25
	Marsh	100	Swans 4,003	18	12
	Water	300	Coots 74,949	158	553
	Total	400	Total 501,832	407	1,465
River, River marsh, and adjacent potholes	Crops		Ducks 760,021	550	1,700
	Upland		Geese 500	18	30
	Marsh	6,000	Swans 6,004	44	6
	Water	2,000	Coots 287,304	680	2,380
	Total	8,000	Total 1,053,829	1,292	4,116
Impoundments: MacDonald Pond, Culver Pond, Shambow Pond, and Others	Crops		Ducks 422,226	90	249
	Upland		Geese 2,890	0	0
	Marsh		Swans 16,680	0	0
	Water	50	Coots 12,491	0	0
	Total	50	Total 454,287	90	249
Creeks: Elk Spring, Red Rock, O'dell and, others	Crops		Ducks 337,781	75	255
	Upland		Geese 700	0	0
	Marsh		Swans 1,334	0	0
	Water	50	Coots 62,457	0	0
	Total	50	Total 402, 272	75	255
Upland Medows	Crops		Ducks 168,890	25	92
	Upland	27,000	Geese 454	0	0
	Marsh	150	Swans 4,003	0	0
	Water	50	Coots 0	0	0
	Total	27,200	Total 173,347	25	92

(over)

INSTRUCTIONS

All tabulated information should be based on the best available techniques for obtaining these data. Estimates having no foundation in fact must be omitted. Refuge grand totals for all categories should be provided in the spaces below the last unit tabulation. Additional forms should be used if the number of units reported upon exceeds the capacity of one page. This report embraces the preceding 12-month period, NOT the fiscal or calendar year, and is submitted annually with the May-August Narrative Report.

(1) Area or Unit: A geographical unit which, because of size, terrain characteristics, habitat type and current or anticipated management practices, may be considered an entity apart from other areas in the refuge census pattern. The combined estimated acreages of all units should equal the total refuge area. A detailed map and accompanying verbal description of the habitat types of each unit should be forwarded with the initial report for each refuge, and thereafter need only be submitted to report changes in unit boundaries or their descriptions.

(2) Habitat: Crops include all cultivated croplands such as cereals and green forage, planted food patches and agricultural row crops; upland is all uncultivated terrain lying above the plant communities requiring seasonal submergence or a completely saturated soil condition a part of each year, and includes lands whose temporary flooding facilitates use of non-aquatic type foods; marsh extends from the upland community to, but not including, the water type and consists of the relatively stable marginal or shallow-growing emergent vegetation type, including wet meadow and deep marsh; and in the water category are all other water areas inundated most or all of the growing season and extending from the deeper edge of the marsh zone to strictly open-water, embracing such habitat as shallow playa lakes, deep lakes and reservoirs, true shrub and tree swamps, open flowing water and maritime bays, sounds and estuaries. Acreage estimates for all four types should be computed and kept as accurate as possible through reference to available maps supplemented by periodic field observations. The sum of these estimates should equal the area of the entire unit.

(3) Use-days: Use-days is computed by multiplying weekly waterfowl population figures by seven, and should agree with information reported on Form NR-1.

(4) Breeding Population: An estimate of the total breeding population of each category of birds for each area or unit.

(5) Production: Estimated total number of young raised to flight age.

Interior Duplicating Section, Washington, D. C. 27580

3-1750b
Form NR-1B
(Rev. Nov. 1957)

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge RED ROCK LAKES For 12-month period ending August 31, 19 64

Reported by Lynn C. Howard Title Assistant Refuge Manager

(1) Area or Unit Designation	(2) Habitat Type	Acreage		(3) Use-days	(4) Breeding Population	(5) Production
Total for Refuge	Crops		Ducks	8,444,532	1,290	5,055
	Upland	27,000	Geese	57,793	36	110
	Marsh	6,610	Swans	66,722	98	24
	Water	6,530	Coots	1,249,150	1,100	3,850
	Total	40,140	Total	9,818,197	2,524	9,039
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			

(over)

INSTRUCTIONS

All tabulated information should be based on the best available techniques for obtaining these data. Estimates having no foundation in fact must be omitted. Refuge grand totals for all categories should be provided in the spaces below the last unit tabulation. Additional forms should be used if the number of units reported upon exceeds the capacity of one page. This report embraces the preceding 12-month period, NOT the fiscal or calendar year, and is submitted annually with the May-August Narrative Report.

(1) **Area or Unit:** A geographical unit which, because of size, terrain characteristics, habitat type and current or anticipated management practices, may be considered an entity apart from other areas in the refuge census pattern. The combined estimated acreages of all units should equal the total refuge area. A detailed map and accompanying verbal description of the habitat types of each unit should be forwarded with the initial report for each refuge, and thereafter need only be submitted to report changes in unit boundaries or their descriptions.

(2) **Habitat:** Crops include all cultivated croplands such as cereals and green forage, planted food patches and agricultural row crops; upland is all uncultivated terrain lying above the plant communities requiring seasonal submergence or a completely saturated soil condition a part of each year, and includes lands whose temporary flooding facilitates use of non-aquatic type foods; marsh extends from the upland community to, but not including, the water type and consists of the relatively stable marginal or shallow-growing emergent vegetation type, including wet meadow and deep marsh; and in the water category are all other water areas inundated most or all of the growing season and extending from the deeper edge of the marsh zone to strictly open-water, embracing such habitat as shallow playa lakes, deep lakes and reservoirs, true shrub and tree swamps, open flowing water and maritime bays, sounds and estuaries. Acreage estimates for all four types should be computed and kept as accurate as possible through reference to available maps supplemented by periodic field observations. The sum of these estimates should equal the area of the entire unit.

(3) **Use-days:** Use-days is computed by multiplying weekly waterfowl population figures by seven, and should agree with information reported on Form NR-1.

(4) **Breeding Population:** An estimate of the total breeding population of each category of birds for each area or unit.

(5) **Production:** Estimated total number of young raised to flight age.

Interior Duplicating Section, Washington, D. C. 27580

3-1750c
Form NP 1C
(Sept. 1960)

WATERFOWL HUNTER KILL SURVEY

Refuge Red Rock Lakes Year 1964

(1) Weeks of Hunting	(2) No. Hunters Checked	(3) Hunter Hours	(4) Waterfowl Species and Nos. of Each Bagged	(5) Total Bagged	(6) Crippling Loss	(7) Total Kill	(8) Est. No. of Hunters	(9) Est. Total Kill
Oct.4-10	17	68	Widgeon (18), Mallard (15), Redhead (10), Canvasback (8), Pintail (6), Lesser Scaup (5), Gadwall (4), G.W.Teal (2)	68	2	70	55	214
Oct.11-17	15	180	Lesser Scaup (20), Pintail (14), Gadwall (10), Canvasback (6), Widgeon (6), Mallard (4)	60	3	63	40	170
Oct.18-24	11	75	Widgeon (17), Mallard (12), Lesser Scaup (9), Pintail (4), Gadwall (2)	44	2	46	22	92
Oct.25-31	4	24	Lesser Scaup (6), Mallard (5), Widgeon (3) Gadwall (2)	16	1	17	13	54
Nov.1-7	2	12	Widgeon (4), Mallard (2), Lesser Scaup (2)	8	0	8	7	28
Nov.8-14			Freeze-up 11/8/64, No hunters					
Nov.15			Duck season terminated 11/12/64					
Dec.17			Goose season terminated 12/17/64 No use of area after close of duck season was observed.					

42 lesser
11 wid
32 mal

(over)

INSTRUCTIONS

(1) The first week of hunting begins with opening day and ends at the close of hunting 6 days later. Successive weeks follow the same pattern.

(2) The goal is to survey a minimum of 25 percent of refuge hunters each week and to record data only from those who have completed their day's hunting. This information should be collected during each day of the week and in each area hunted in relative proportion to the hunter effort expended. When the 25 percent goal cannot be achieved, particular care should be taken to collect representative data.

(3) Record the total number of hours the hunters spent hunting on the refuge.

(4) List waterfowl species in decreasing order of numbers bagged. Sample entry: Mallard (61), Pintail (36), Redhead (16), Gadwall (11), Widgeon (6), Coot (4), Canada Goose (3), Green-winged Teal (1).

(5) Record total numbers of waterfowl bagged.

(6) Record total numbers of waterfowl reported knocked down but not recovered.

(7) Total of Columns 5 and 6.

(8) Estimate the total number of hunters who hunted on the refuge during the week, including hunters checked (Column 2).

(9) Kill sample projected to 100 percent. Column 9 = $\frac{\text{Column 8}}{\text{Column 2}}$ x Column 7.

3-1752
Form [illegible]-2
(April 1946)

UPLAND GAME BIRDS

Refuge RED ROCK LAKES Months of January to April, 19 64

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ruffed grouse	Aspen fir 3,000	50							60	
Blue grouse	Conifer 3,000	150							20	
Sage grouse										None known to have migrated back on the area by the close of the period.

3-1752
Form [illegible]-2
(April 1946)

UPLAND GAME BIRDS

Refuge RED ROCK LAKES Months of January to April, 19 64

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ruffed grouse	Aspen fir 3,000	50							60	
Blue grouse	Conifer 3,000	150							20	
Sage grouse										None known to have migrated back on the area by the close of the period.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1752
Form [illegible]-2
(April 1946)

UPLAND GA[illegible] BIRDS

Refuge Red Rock Lakes Months of May to August, 1964

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Sage grouse	3,000 acres sage brush association	150	0						20	
Ruffed grouse	3,000 acres aspen fir association	75	0						40	
Blue grouse	3,000 acres aspen fir association	30	0						10	

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1752
Form [illegible]-2
(April 1946)

UPLAND GAME BIRDS

Refuge Red Rock Lakes Months of September thru December, 19 64

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Sage Grouse	3,000 acres Sagebrush community	60	1						50	
Ruffed Grouse	3,000 acres Aspen-fir	50							60	
Blue Grouse	Conifer 3,000 acres	150							20	
Hungarian Partridge	Sagebrush Meadow								35	In vicinity of swan feeding ponds.
Chinese Pheasant									2	At refuge headquarters.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-17
Form NR-3
(June 1945)

BI[illegible]AME

Refuge Red Rock Lakes Calendar Year 1964

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions		(7) Estimated Total Refuge Population		(8) Sex Ratio
Common Name	Cover types, total Acreage of Habitat	Number	Hunting	For Re-stocking	Sold	For Research	Predation	Disease	Winter Loss	Number	Source	At period of Greatest use	As of Dec. 31	
Shiras Moose	Willow, marsh, aspen-willow, conifer 5,000 acres	6							1			30	9	2 M 8 F
Mule Deer	Timber, sagebrush, meadow, 5,000 acres	20					3		5			130	50	1 M 7 F
Antelope	Sagebrush, meadow, 16,000 acres	220	25				10					650	0	11 M 12 F
Elk	Timber, sagebrush, meadow, 5,000 acres	This refuge is used in a nomadic manner by this species during spring and late fall.										12		

Remarks:

Reported by C. W. Gibbons

INSTRUCTIONS

Form NR-3 - BIG GAME

(1) SPECIES: Use correct common name; i.e., Mule deer, black-tailed deer, white-tailed deer. It is unnecessary to indicate sub-species such as northern or Louisiana white-tailed deer.

(2) DENSITY: Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge: once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated total number of young produced on refuge.

(4) REMOVALS: Indicate total number in each category removed during the year.

(5) LOSSES: On the basis of known records or reliable estimates indicate total losses in each category during the year.

(6) INTRODUCTIONS: Indicate the number and refuge or agency from which stock was secured.

(7) TOTAL REFUGE POPULATION: Give the estimated population of <u>each</u> <u>species</u> on the refuge at period of its greatest abundance and also as of Dec. 31.

(8) SEX RATIO: Indicate the percentage of males and females of each species as determined from field observations or through removals.

3-17
Form NR-4
(June 1945)

SMALL MAMMALS

Refuge RED ROCK LAKES Year ending April 30, 1961

(1) Species	(2) Density		(3) Removals					(4) Disposition of Furs						(5)
								Share Trapping						
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator Control *	For Re-stocking	For Re-search	Permit Number	Trappers Share	Refuge share	Total Refuge Furs Shipped	Furs Donated	Furs Destroyed	Total Population
Mink	Lakes, streams 15,000	60												250
Striped skunk	Marsh, meadows, upland, 26,000	87			8									300
Badger	Meadows, upland 19,000	95			1									200
Red fox	Marsh, meadows, upland, 26,000	87			6									300
Bobcat	Upland, forests 25,000	1250												20
Beaver	Willows, aspens 24,00	60												40
Muskrat	Marsh 10,000	6												1500
Porcupine	Upland forests 5,000	125												100

* List removals by ~~Predatory Animal Hunter~~ Refuge personnel

REMARKS: Censuring based on random observations. Only key mammals to our present management considered.

Reported by G.A.Devan, Wildlife Mgt. Biologist

INSTRUCTIONS

Form NR-4 - SMALL MAMMALS (Include data on all species of importance in the management program; i. e., muskrats, beaver, coon, mink, coyote. Data on small rodents may be omitted except for estimated total population of each species considered in control operations.)

(1) SPECIES: Use correct common name. Example: Striped skunk, spotted skunk, short-tailed weasel, gray squirrel, fox squirrel, white-tailed jackrabbit, etc. (Accepted common names in current use are found in the "Field Book of North American Mammals" by H. E. Anthony and the "Manual of the Vertebrate Animals of the Northeastern United States" by David Starr Jordan.)

(2) DENSITY: Applies particularly to those species considered in removal programs. Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottom land hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) REMOVALS: Indicate the total number under each category removed since April 30 of the previous year, including any taken on the refuge by Service Predatory Animal Hunter. Also show any removals not falling under headingslisted.

(4) DISPOSITION OF FUR: On share-trapped furs list the permit number, trapper's share, and refuge share. Indicate the number of pelts shipped to market, including furs taken by Service personnel. Total number of pelts of each species destroyed because of unprimeness or damaged condition, and furs donated to institutions or other agencies should be shown in the column provided.

(5) TOTAL POPULATION: Estimated total population of each species reported on as of April 30.

REMARKS: Indicate inventory method(s) used, size of sample area(s), introductions, and any other pertinent information not specifically requested.

3-175
Form Nn-5

DISEASE

Refuge Red Rock Lakes Year 19 64

Botulism

Period of outbreak _____

Period of heaviest losses _____

Losses:

	Actual Count	Estimated
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Number Hospitalized	No. Recovered	% Recovered
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Areas affected (location and approximate acreage) _____

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc.

Condition of vegetation and invertebrate life _____

Remarks _____

Lead Poisoning or other Disease

Kind of disease Fowl Cholera

Species affected Trumpeter Swan

Number Affected Species	Actual Count	Estimated
	1	

Number Recovered _____

Number lost 1

Source of infection Unknown

Water conditions Normal

Food conditions Normal

Remarks _____

INT.-DUP., D.C.- 53818-59

NR-6 Bureau of Sport Fisheries and Wildlife

PUBLIC RELATIONS

(See Instructions on Reverse Side)

Refuge Red Rock Lakes Calendar Year 1964

1. Visits

a. Hunting 1,310 b. Fishing 950 c. Miscellaneous 3,720 d. TOTAL VISITS 5,980

1a. Hunting (on refuge lands)

TYPE	HUNTERS	ACRES	MANAGED BY
Waterfowl	410	8,000	BSFW
Upland Game			
Big Game	900	9,000	BSFW
Other			

Number of permanent blinds 0

Man-days of bow hunting included above 0

Estimated man-days of hunting on lands adjacent to refuge 2,000

1b. Fishing (area open to fishing on refuge lands)

TYPE OF AREA	ACRES	MILES
Ponds or Lakes	45	
Streams and Shores		10

1c. Miscellaneous Visits

Recreation 3,100 Official 200

Economic Use 420 Industrial 0

2. Refuge Participation (groups)

TYPE OF ORGANIZATION	"On Refuge" NO. OF GROUPS	"On Refuge" NUMBER IN GROUPS	"Off Refuge" NO. OF GROUPS	"Off Refuge" NUMBER IN GROUPS
Sportsmen Clubs			1	65
Bird and Garden Clubs				
Schools	1	10		
Service Clubs				
Youth Groups				
Professional-Scientific			2	150,24
Religious Groups				
State or Federal Govt.	5	2,2,2,3,5	2	40,35
Other				

3. Other Activities

TYPE	NUMBER	TYPE	NUMBER
Press Releases	1	Radio Presentations	0
Newspapers . (P.R.'s sent to)	0	Exhibits	0
TV Presentations	0	Est. Exhibit Viewers	0

3-1756
(Rev. 4/63)

INSTRUCTIONS

Item 1: Total of a, b, and c, equal d.

"Visit" - definition. Any person who is on refuge lands or waters during a day or part thereof for the purpose of: hunting, fishing, bird-watching, recreation, business or economic use, official visit, or similar interest. INCLUDE - those who stop within the refuge while traveling on a public highway because of an interest in the area. EXCLUDE - persons engaged in oil or other industry not directly related to the refuge, persons using refuge as most direct route or principal avenue of traffic, and those boating on navigable rivers or the Intercoastal Canal, unless they stop to observe wildlife on the refuge.

Computing visits. Where actual counts are impractical, "sampling" is used with midweek and weekend samples varied by season or weather. A conversion factor of 3.5 (of passengers per car) is used when accurate figures are not available. Each refuge will develop a conversion factor for boats based on range of usage. Count a camper once for each 24-hour period or fraction thereof.

Item 1a: Acres - of refuge open for each type of hunting.

Managed hunts require check in and out of hunters, issuance of permits, or assignment of blinds.

Other - INCLUDE crow, fox, and similar hunting.

Lands adjacent to refuge. Normally considered within 1 mile or less of boundary, unless established sampling procedures cover a wider area. For big game hunting, the distance may be greater.

Item 1b: Acres of streams open to fishing, if practical; otherwise just miles open. Information on "shores" is primarily for coastal fishing.

Item 1c: Recreation. INCLUDE photography, observing wildlife, picnicking, swimming, boating, camping, visitor center use, tours, etc. TOTAL Recreation, Official, and Economic Use visits under Item 1.

Industrial. INCLUDE persons engaged in industry, i.e., oil industry or factories. EXCLUDE these from Item 1.

Item 2: INCLUDE the "On Refuge" groups in Items 1c and 1. In "Off Refuge" column include only those group meetings in which refuge employees actually participate. EXCLUDE these from Items 1c and 1.

Item 3: Exhibits - INCLUDE displays, fairs, parades, and exhibits OFF the refuge; EXCLUDE those ON.

3-1757
Form NR-7
(Rev. June 1960)

NONAGRICULTURAL COLLECTIONS, RECEIPTS, AND PLANTINGS (1)

Refuge Red Rock Lakes Year 19 64

Species	Collections and Receipts (Seeds, rootstocks, trees, shrubs)						Plantings (Marsh - Aquatic - Upland)						
	Amount (Lbs., bus., etc.)	(2) C or R	Date	Method or Source	Cost	(3) Total Amount on Hand	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount and Nature of Propagules	Date	Survival	Cause of Loss
Caragana							Headquarters Shambow Pond		 50 yards	 25 ea.	 June	Unknown	
Russian Olive							Headquarters MacDonald Pond Shambow Pond		 .5 acre 200 yards	 50 ea.	 June		
Chinese Elm							Headquarters MacDonald Pond Shambow Pond		 .5 acre 200 yards	 50 ea.	 June		
Northern Cottonwoods							Headquarters MacDonald Pond Shambow Pond		 .5 acre 400 yards	 50 ea.	 June		
Hybrid Elm							Headquarters			2 ea.	June		
Weeping Willow							Headquarters area			2 ea.	June		

(1) Report agronomic farm crops on Form NR-8
(2) C = Collections and R = Receipts
(3) Use "S" to denote surplus

Total acreage planted:
Marsh and aquatic _____
Hedgerows, cover patches _____
Food strips, food patches 1.5
Forest plantings _____

Remarks: Species planted at headquarters site for ornamental purposes. Mostly adjacent to refuge residences.

76148

3-1758
Form NR-8
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge Red Rock Lakes County Beaverhead State Montana

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Waterfowl Browsing Crops Type and Kind	Total Acreage
			Harvested		Unharvested				
	Acres	Bu./Tons	Acres	Bu./Tons	Acres	Bu./Tons			
				NONE					
								Fallow Ag. Land	

No. of Permittees: Agricultural Operations - Haying Operations 3 Grazing Operations 21

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	GRAZING	Number Animals	AUM'S	Cash Revenue	ACREAGE
				1. Cattle	5,354	17,741.23	$31,047.15	27,320
				2. ~~Horses~~ Horses	4	11.44	20.02	45
				1. Total Refuge Acreage Under Cultivation				
Hay - Wild	758.45	1,563	$3,792.35	2. Acreage Cultivated as Service Operation				

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS - HAYING - GRAZING

Report Form NR-8 should be prepared on a calendar-year basis for all crops which were planted during the calendar year and for haying and grazing operations carried on during the same period.

Separate reports shall be furnished for Refuge lands in each county when a refuge is located in more than one county or State.

Cultivated Crops Grown - List all crops planted, grown and harvested on the refuge during the reporting period regardless of purpose. Crops in kind which have been planted by more than one permittee or this Service shall be combined for reporting purposes.

Permittee's Share - Only the number of acres utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. Report all crops harvested in bushels or fractions thereof except such crops as silage, watermelons, cotton, tobacco, and hay, which should be reported in tons or fractions thereof.

Government's Share or Return - Harvested - Show the acreage and number of bushels harvested for the Government of crops produced by permittees or refuge personnel. Unharvested - Show the exact acreage and the estimated number of bushels of grain available for wildlife. If grazing is made available to waterfowl through the planting of grain, cover, green manure, grazing or hay crops, estimate the tonnage of green food produced or utilized and report under Bushels Unharvested column.

Total Acreage Planted - Report all acreage planted, including crop failures.

Green Manure, Cover and Waterfowl Grazing Crops - Specify the acreage, kind and purpose of the crop. These crops and the acreage may be duplicated under cultivated crops if planted during the year, or a duplication may occur under hay if the crop results from a perennial planting.

Hay - Improved - List separately the kinds of improved hay grown. Annual plantings should also be reported under Cultivated Crops, and perennial hay should be listed in the same manner at time of planting.

Total Refuge Acreage Under Cultivation - Report total land area devoted to agricultural purposes during the year.

INT.DUP.,D.C.61-88850

3-1570
NR-8a

REFUGE GRAIN REPORT

Refuge RED ROCK LAKES Months of January through April, 1954

(1) Variety*	(2) On Hand Beginning of Period	(3) Received During Period	(4) Total	(5) Grain Disposed of				(6) On Hand End of Period	(7) Proposed or Suitable Use*		
				Transferred	Seeded	Fed	Total		Seed	Feed	Surplus
Wheat and barley	1,399	0	1,399			911	911	488		* 488	

(8) Indicate shipping or collection points Culver and MacDonald Ponds

(9) Grain is stored at Actual bushels on hand appear more than 488. Reconciled computations will be made next summer.

(10) Remarks

*See instructions on back.

NR-8a

REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lb., corn (ear)—70 lb., wheat—60 lb., barley—50 lb., rye—55 lb., oats—30 lb., soy beans—60 lb., millet—50 lb., cowpeas—60 lb., and mixed—50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

(1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR–9.

(3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.

(4) A total of columns 2 and 3.

(6) Column 4 less column 5.

(7) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.

(8) Nearest railroad station for shipping and receiving.

(9) Where stored on refuge: "Headquarters granary," etc.

(10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

INT.-DUP. SEC., W[illegible], D.C. 59323

3-1570
NR-8a

REFUGE GRAIN REPORT

Refuge RED ROCK LAKES Months of May through December, 1965

(1) Variety*	(2) On Hand Beginning of Period	(3) Received During Period	(4) Total	(5) Grain Disposed of				(6) On Hand End of Period	(7) Proposed or Suitable Use*		
				Transferred	Seeded	Fed	Total		Seed	Feed	Surplus
Wheat and Barley	300	1,050	1,350			364	364	986		986	

(8) Indicate shipping or collection points Camas National Wildlife Refuge

(9) Grain is stored at Culver and MacDonald Ponds

(10) Remarks Supplemental winter swan feed.

*See instructions on back.

NR-8a

REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lb., corn (ear)—70 lb., wheat—60 lb., barley—50 lb., rye—55 lb., oats—30 lb., soy beans—60 lb., millet—50 lb., cowpeas—60 lb., and mixed—50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

(1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR–9.

(3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.

(4) A total of columns 2 and 3.

(6) Column 4 less column 5.

(7) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.

(8) Nearest railroad station for shipping and receiving.

(9) Where stored on refuge: "Headquarters granary," etc.

(10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

INT.-DUP. SEC., W[illegible], D.C. 59323